

Sieving for small fossils  
Or “mini-fossils and a pair of tights”

By Mike Horne FGS

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Small fossils are quite abundant in water-deposited sedimentary rocks.

They are often well preserved because they have been rapidly buried relative to their size

You will need some equipment to get started

- Clean sample bags and a trowel for collecting
- A kitchen sieve and magnifying glass
- Or a nylon stocking supported by a kitchen sieve
- Or a shallow basin for “panning”
- Or a professional sieve and a binocular microscope
- Sample tubes or cavity microscope slides for storage



What are small fossils?

Mesofossils – my term for fossils from about 2mm up to about 1 cm.

They can be seen with naked eye or magnifying glass.

- Juvenile macrofossils
- Small species
- Bits of macrofossils – sea urchin spines and crinoid columnals, for example.

Microfossils – fossils to be viewed through a microscope, usually 2mm or less.

Nannofossils – very small fossils to be viewed with high powered microscope or electron microscope. About a few microns in size. Such as pollen, dinoflagellates, coccoliths. Beyond my capabilities.

## Small fossils

### **Advantages –**

- Often abundant
- Well preserved
- You can do environmental statistics with them to find water depth and salinity
- You can do a lot of the work at home in the warm

### **Disadvantages –**

- Takes time to process
- Works great for very soft rocks, but not tough ones
- Need to avoid contamination
- Need to do accurate collecting and labelling

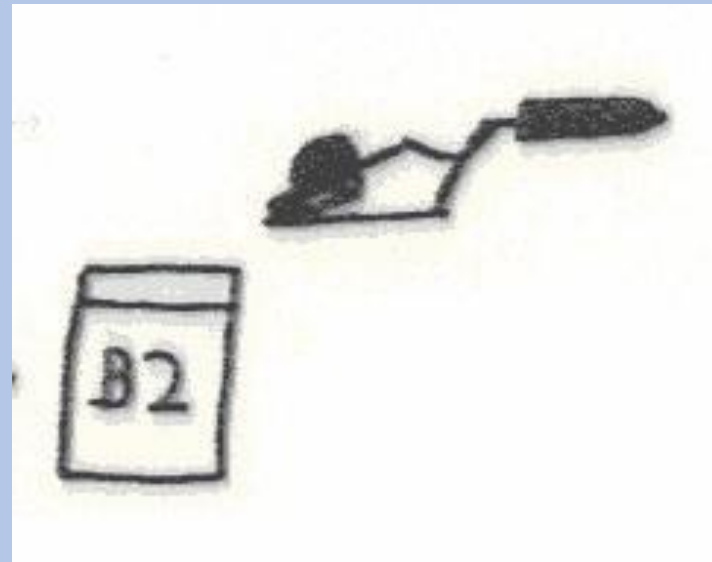
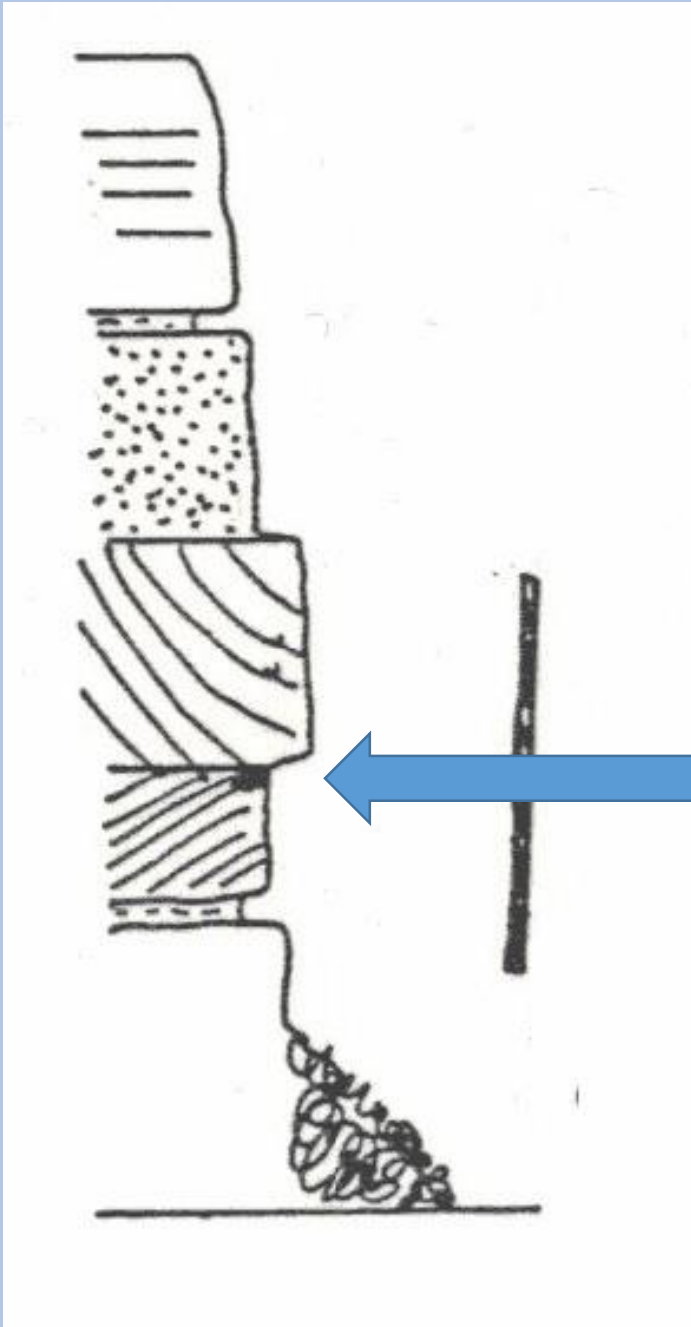
(raw samples can look very similar)

- Good equipment can cost a bit

(but you can start with a magnifying glass and kitchen sieve)

- Sometimes after all the preparation a sample is barren
- difficult to photograph them
- It is hard to write the catalogue numbers on them!

Record the location and stratigraphy.  
Clean the face a bit to avoid contamination.  
Put your sample into a clean sample bag.  
Label it and record it in your notebook.





Process the sample –

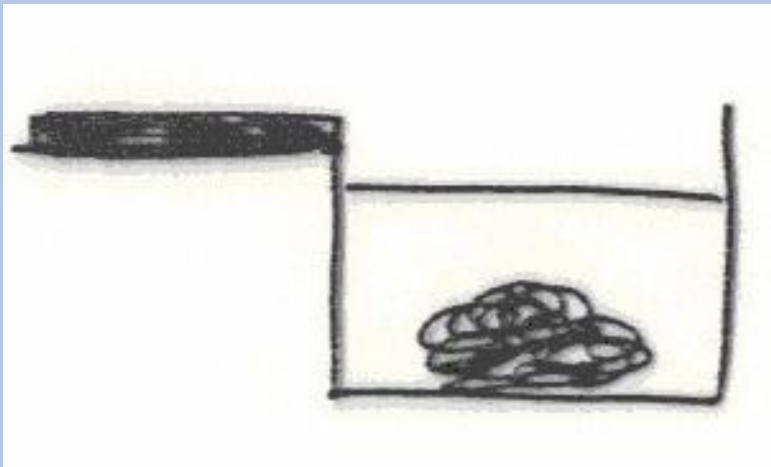
Dry it and weigh it.

Wet sieve it with lots of water,  
a bit at a time if necessary so that the sieve  
does not block up and overflow

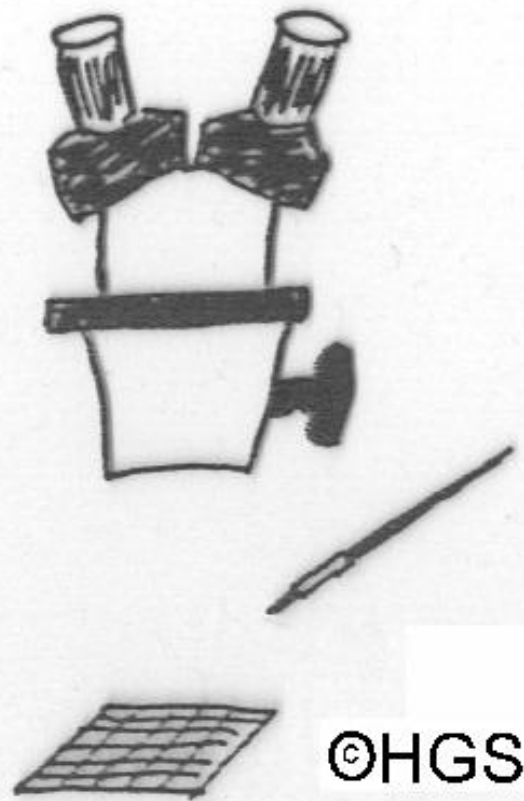
Wash it into a coffee filter paper with a  
squeezezy bottle to dry.

Weigh the “residue”

Put it into a clean sample bag and label it.



If the sample resists – try boiling it up in a  
non-aluminium saucepan with water and a  
desert spoon of washing soda (or a teaspoon  
of old fashioned Calgon) until it looks like  
“school dinners custard”. Allow it to cool a bit  
and then sieve a bit at a time.



Look through your “residue” for fossils  
Scatter some of the residue thinly on to a picking tray  
Then examine it with a magnifying glass and tweezers or a binocular microscope and dampened fine haired artists’ paint brush.  
Transfer the fossils into storage – a plastic box, glass sample tube or cavity slide.





A 9x9 grid representing a picking tray. The cells are numbered as follows:

1	2	3	4	5		etc		9
		etc		etc		12	11	10

A numbered “picking tray” used to avoid “picking the same part of the sample repeatedly. Made of flat card or metal (such as a tobacco tin lid)



Juvenile Ammonites  
(Scale is mm)



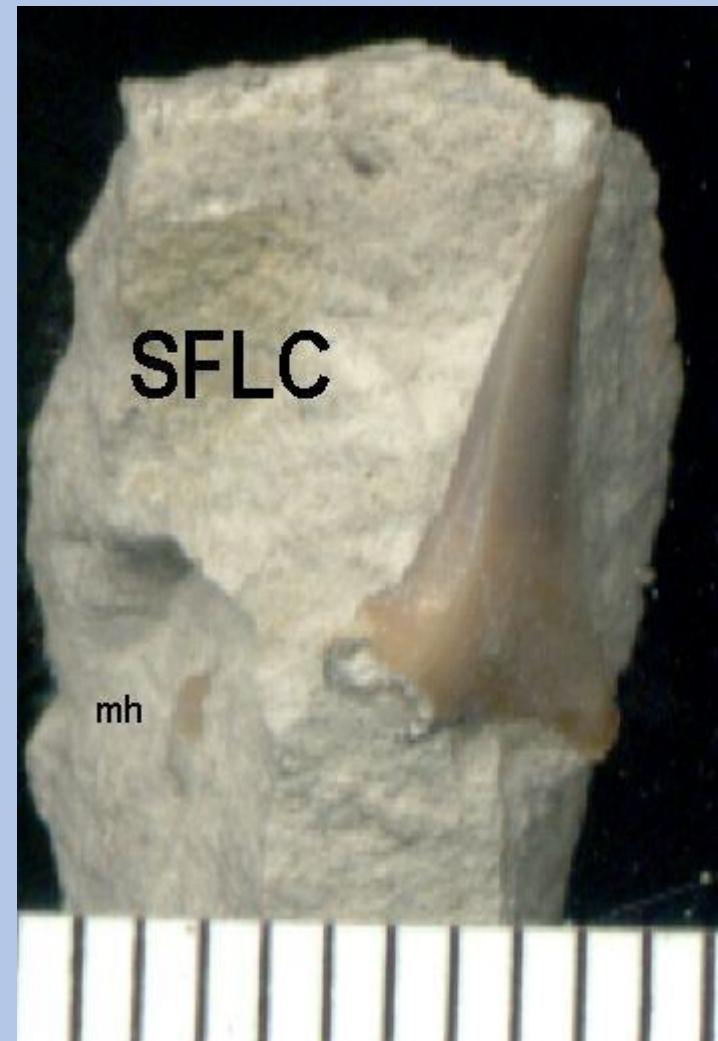
Crinoid stems (scale is mm)

BAIN3

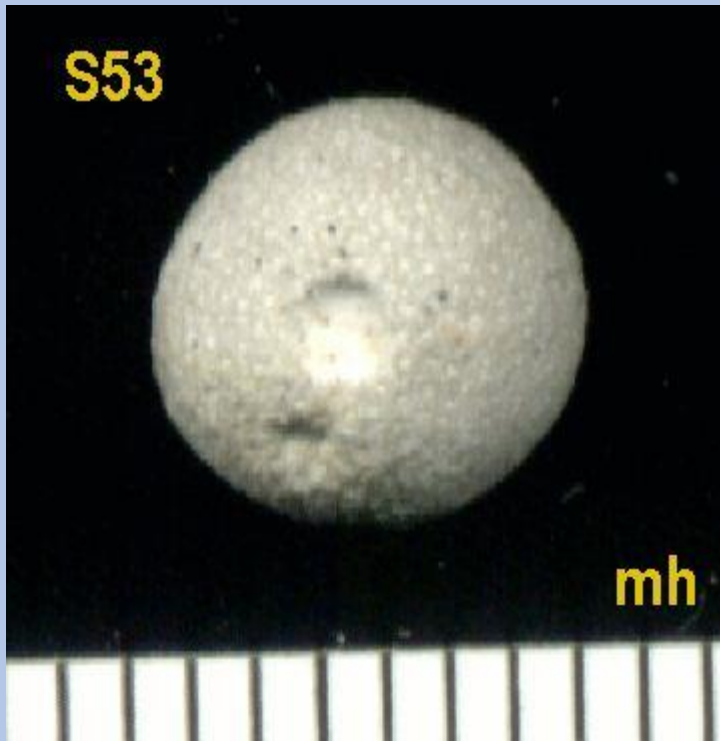


Sea urchin spines

SFLC



Shark's tooth



sponge

*Scale is mm*

snails

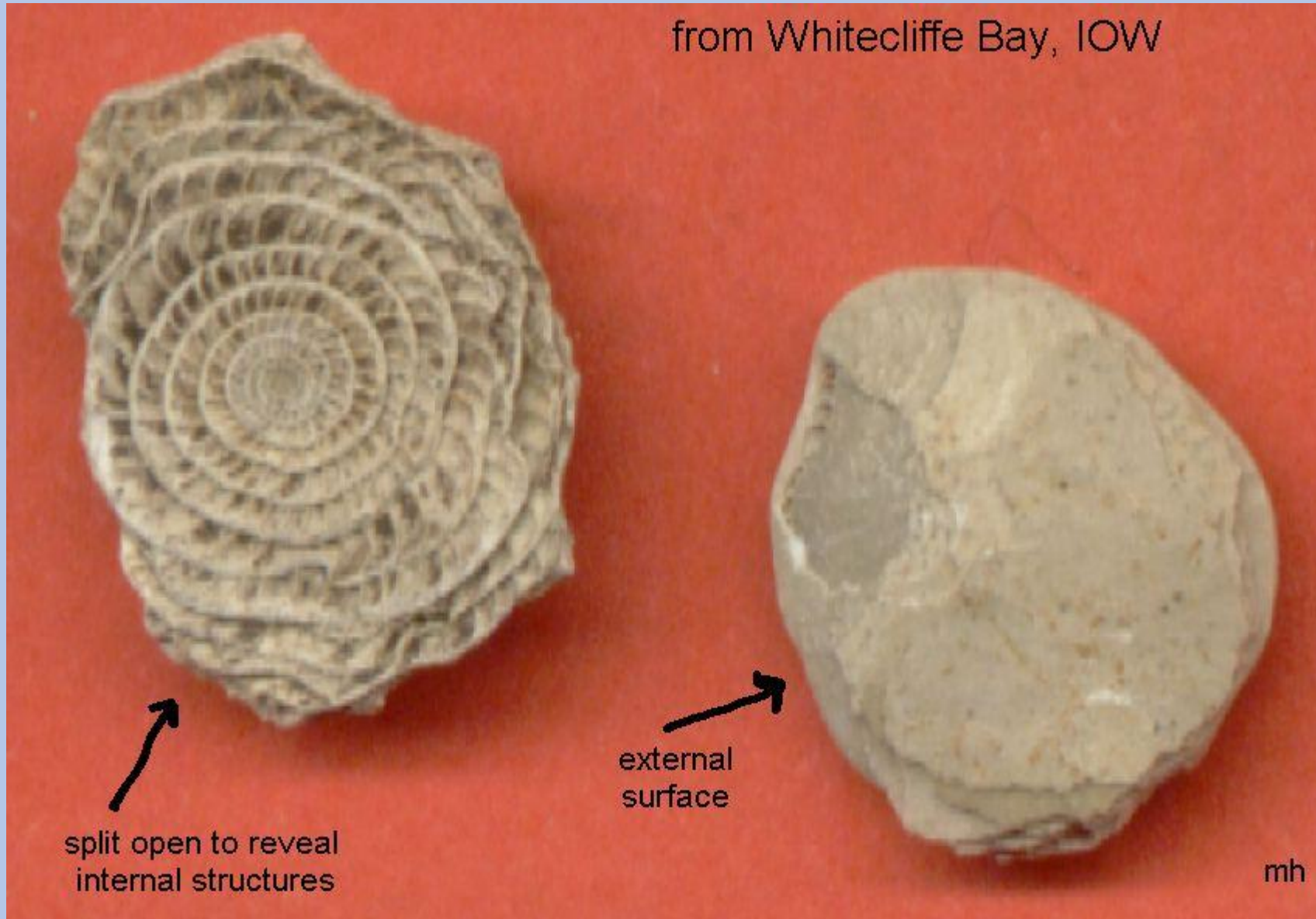


poo



Scaphopods (“tusk shells”)

from Whitecliffe Bay, IOW



*Nummulites* – this is a large microfossil about 1cm in diameter

Equipment for use in the kitchen and at home for finding mesofossils—

Kitchen sieve

Pair of tights (perhaps) – not fishnet ones!

Lots of water

Swirling thing on your tap

A funnel

Coffee filter papers

Clean sample bags

“picking” tray

Magnifying glass

Pair of tweezers

A reading lamp (perhaps)

A sauce pan (perhaps) – not aluminium!

Washing soda



Sediments suitable for sieving  
Normally post Palaeozoic

Clays and silts

Marly clay bands in the Chalk

Soft Chalk (from Norfolk or Holderness Cliffs)

Loose Oolitic limestones \*

Shelly beach sand

Beach sand \*

Boulder Clay \*

Seaside and estuarine mud (includes living organisms)

\* Note - these will contain a lot of mineral grains to sort through = requires dedication!

## Microfossils –

Foraminifera – single celled organisms that make chambered tests (=shells)

They are all marine and have different life styles and water depth

- Agglutinated – make test from grains of sediment
- Porcelaneous – opaque tests
- Benthic – translucent tests, bottom dwelling
- Planktic – thin transparent tests, floating
- Large – big benthic ones

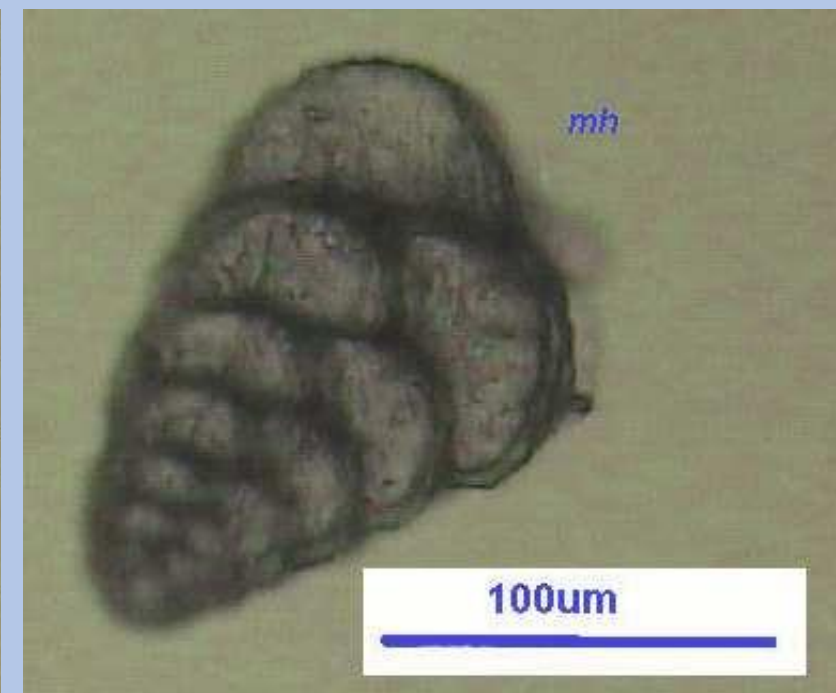
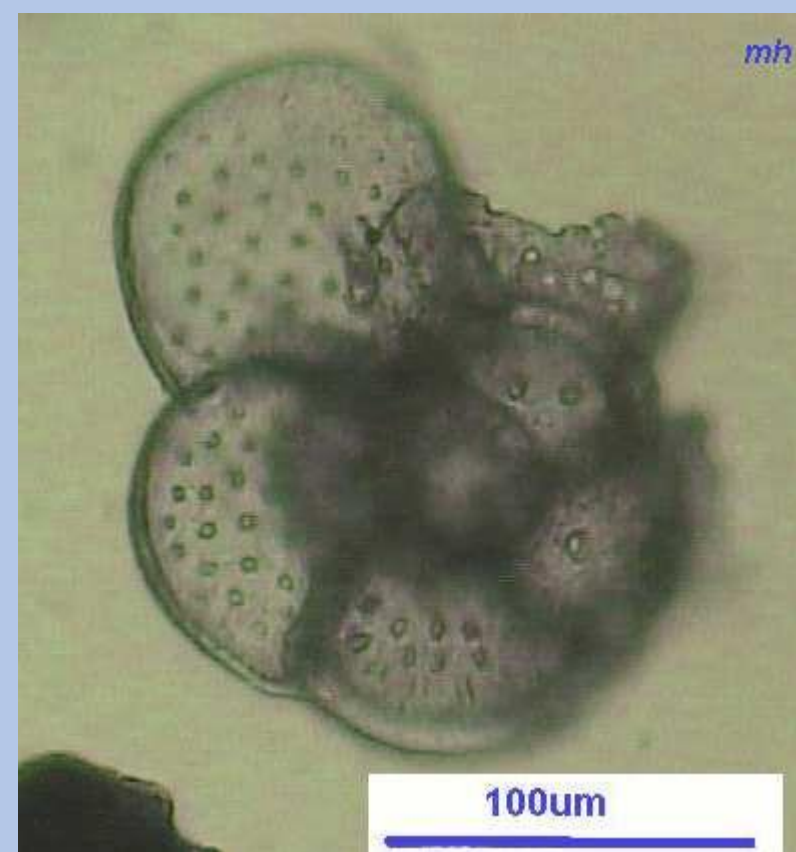
Ostracods – bivalved crustaceans – think of a small shrimp in a pistachio shell

Freshwater and marine. Crawling or swimming.

Chara – fruiting body of a freshwater plant

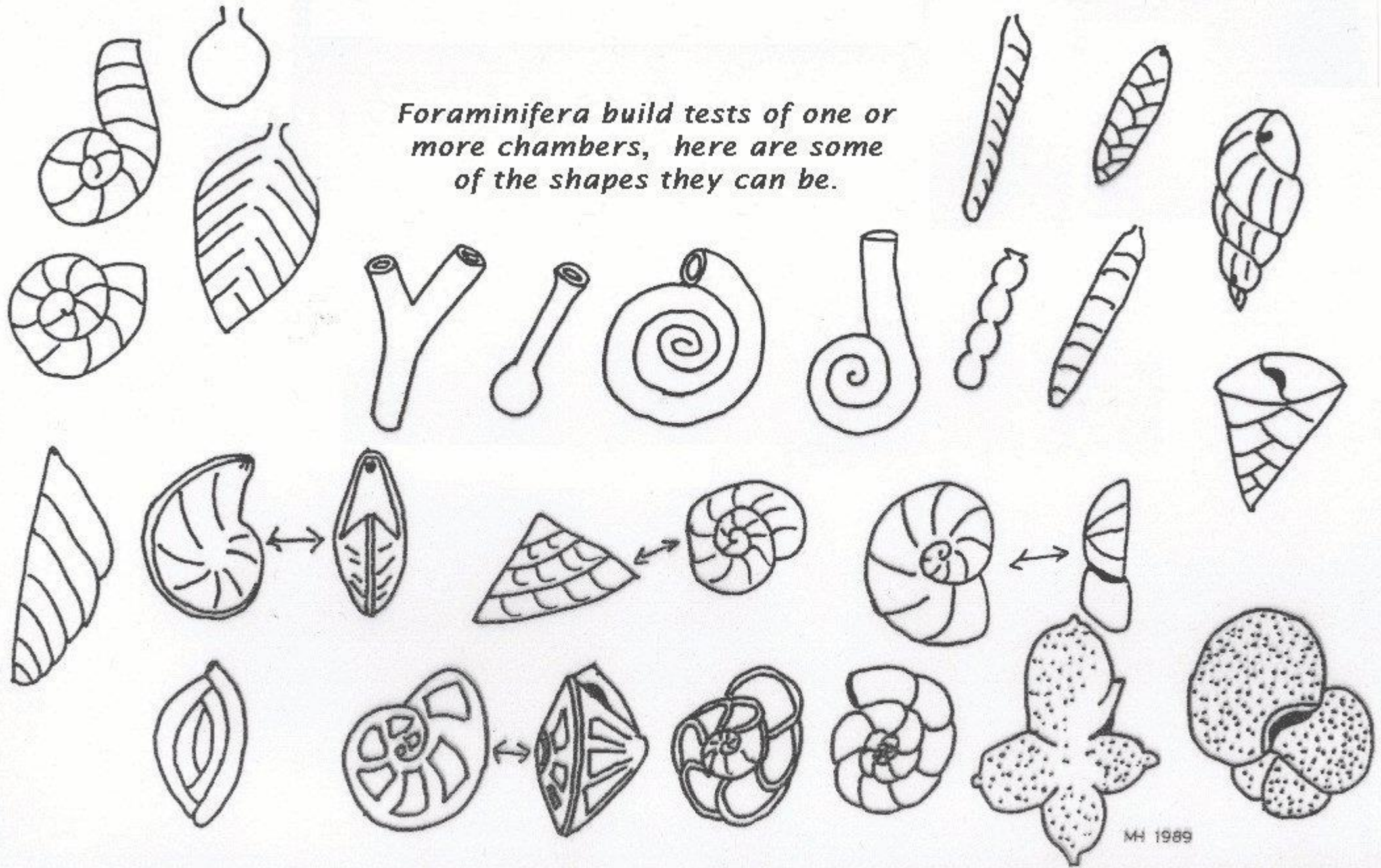
Calcispheres – calcite globes

(note – this is a big simplification)

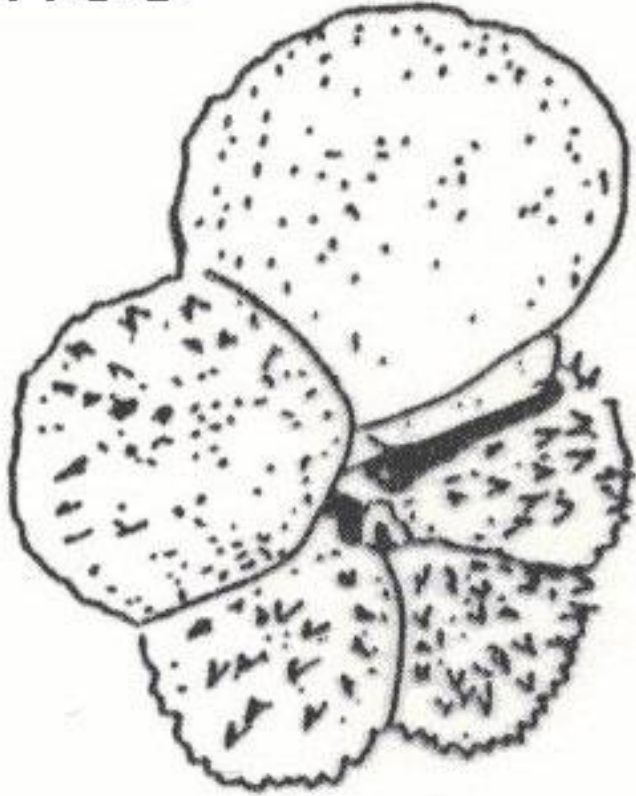


Some foraminifera from the Yorkshire Chalk in thin sections. Forams are single celled creatures that form these chambered beautiful shells (called “tests”).

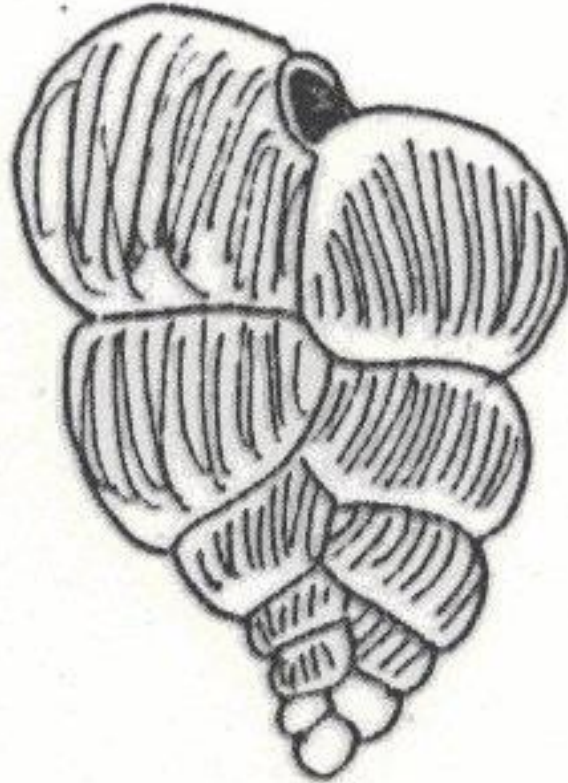
*Foraminifera build tests of one or more chambers, here are some of the shapes they can be.*



©HGS



*Hedbergella*

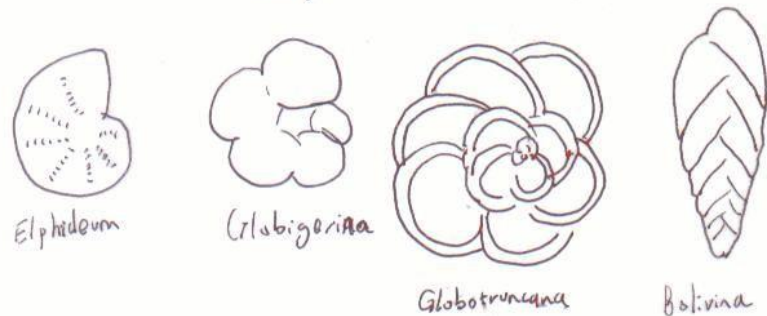
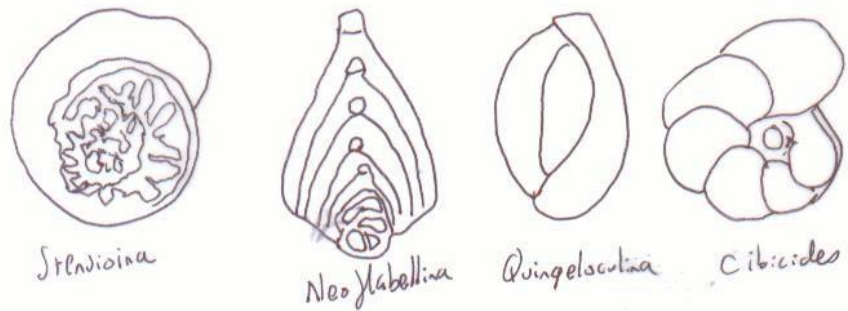
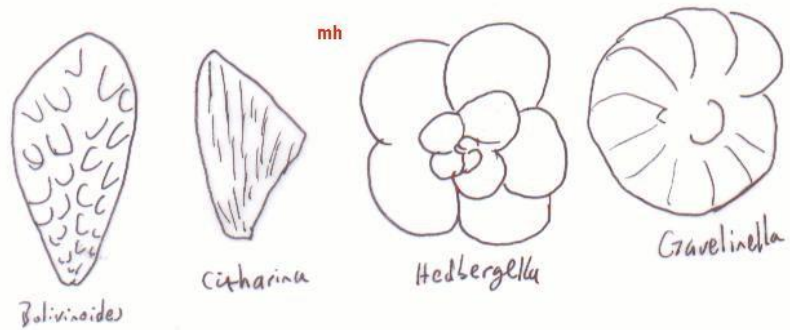


*Heterohelix*

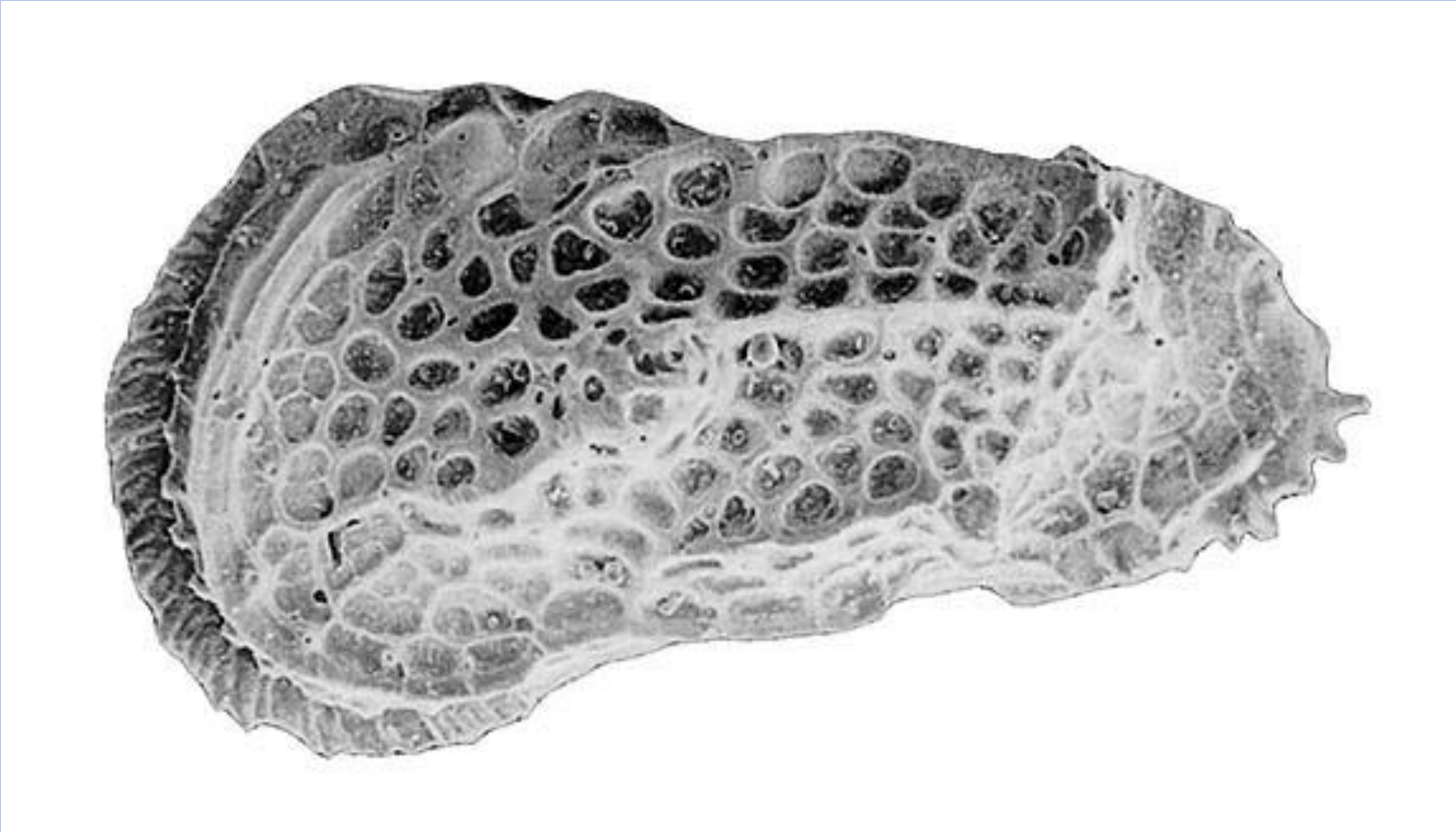
Forams are all marine single celled creatures. Benthic ones live at the bottom of the sea, on seaweed or in the sediment. Lighter ones are planktonic – floating in the water.

Some planktonic foraminifera

## Foraminifera from the Chalk

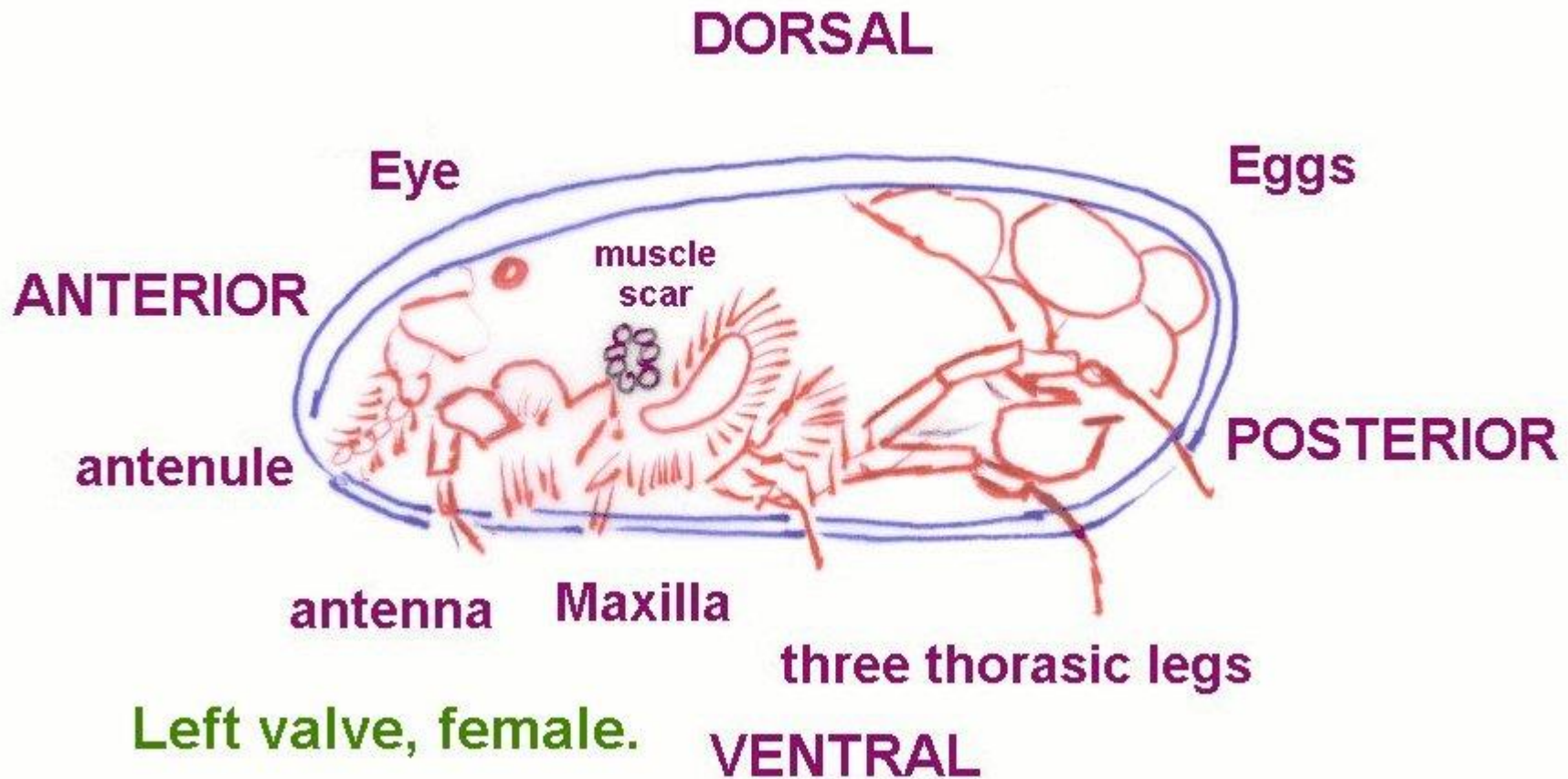


Some of these forams can be used as zone fossils to date the rocks and correlate exposures.



A podocopid ostracod from the mid-Cretaceous, *Isocythereis fissicostis*  
*fissicostis* Triebel, 1940. I P Wilkinson, BGS © UKRI.  
(from British Geological Survey website)

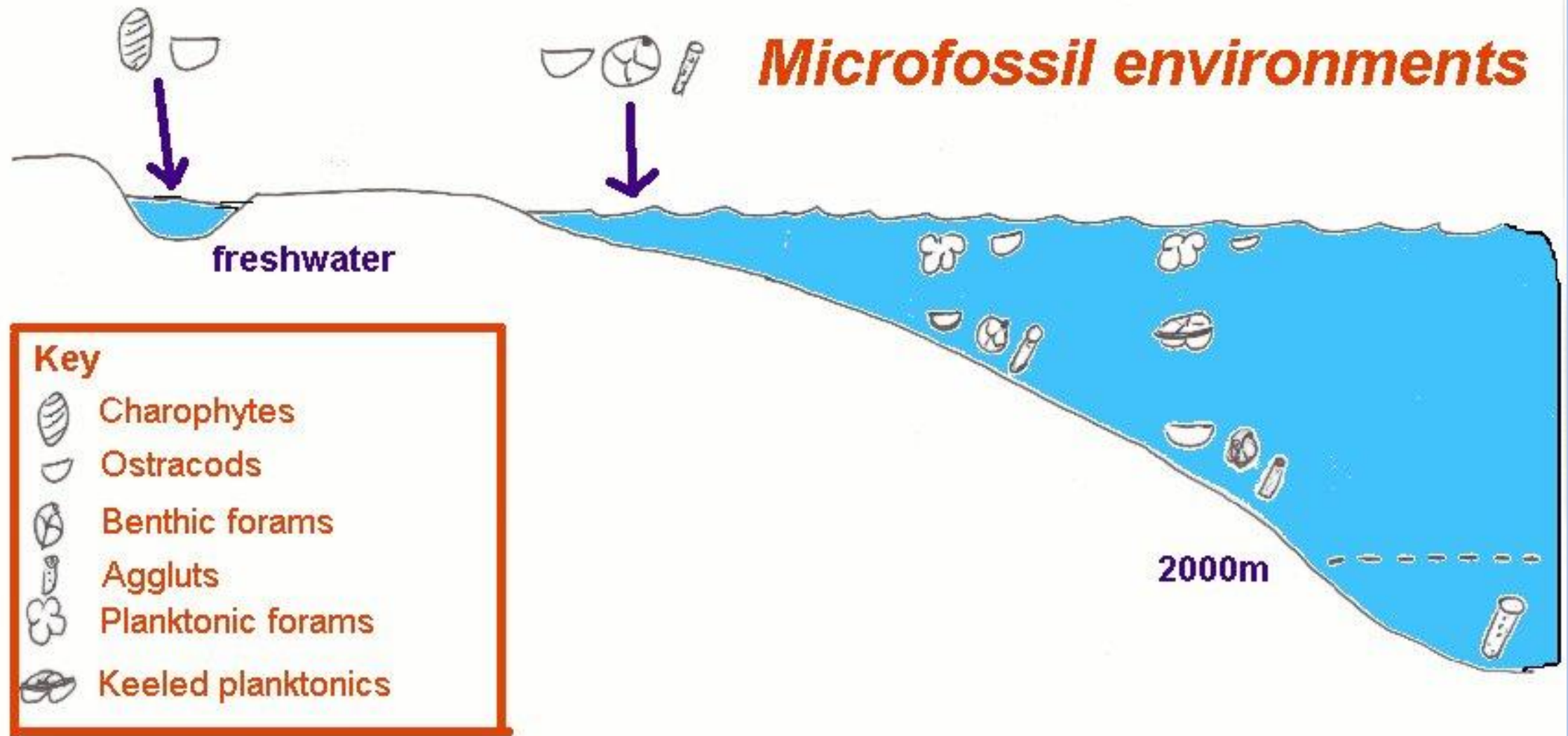
## Morphology of the Ostracod animal



Ostracods are shrimp like animals in a bivalve shell that looks a bit like a pistachio. They live in fresh water and marine environments and can be used as indicators of salinity.



## Microfossil environments

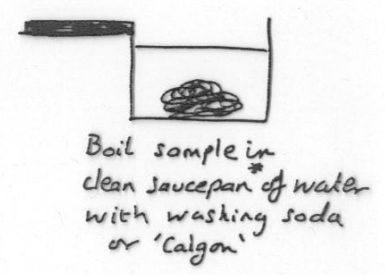
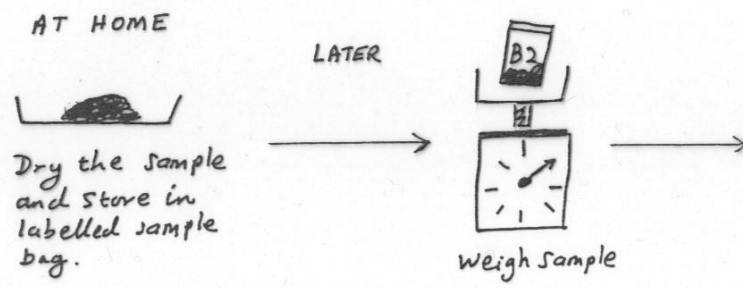
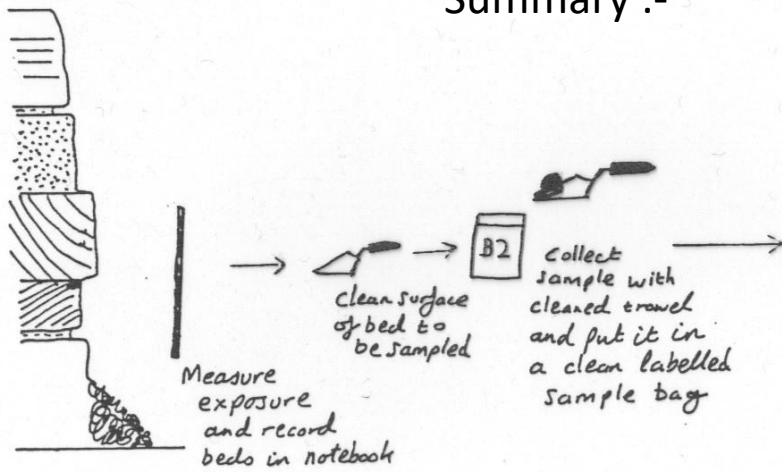


If you are going to study microfossils seriously you will be staring down the microscope quite a lot. So set things up to avoid back ache and eye strain. It is a bit like having your computer display screen set up properly.

Here are some hints: Have an adjustable (computer operators style) chair. Set it at the right height so your feet are on the floor and your thighs parallel to the floor or sloping slightly downwards. Set the back to be upright. Sit facing your work desk, not skewed. Set the microscope up so you are not bending your head too much and you can rest your “picking” hand beside it; put it on some books or a box to get the right height.

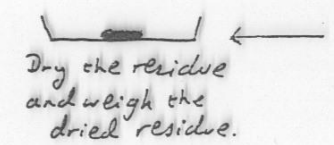
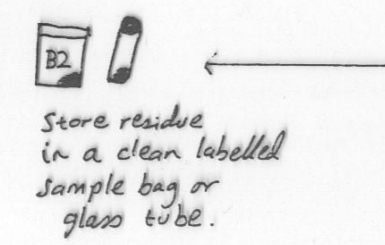
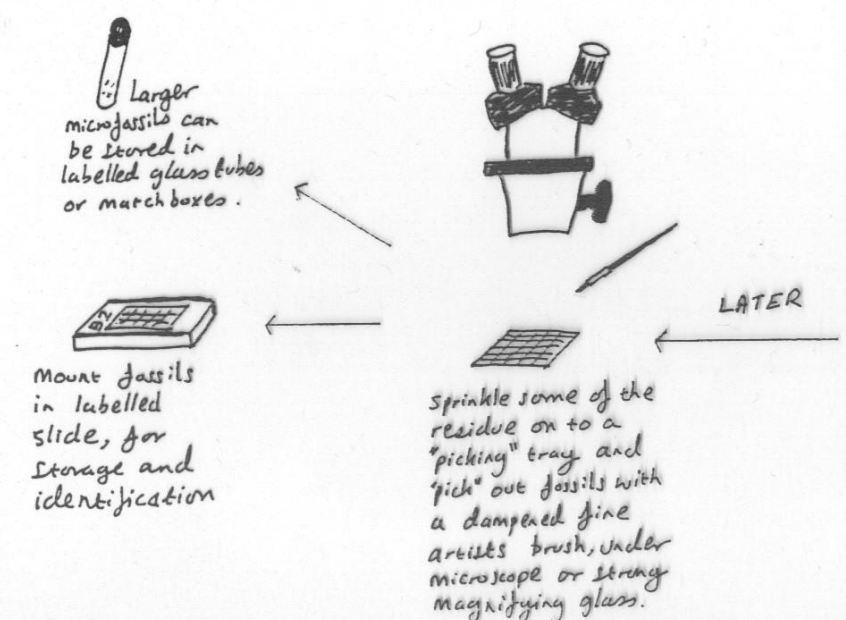
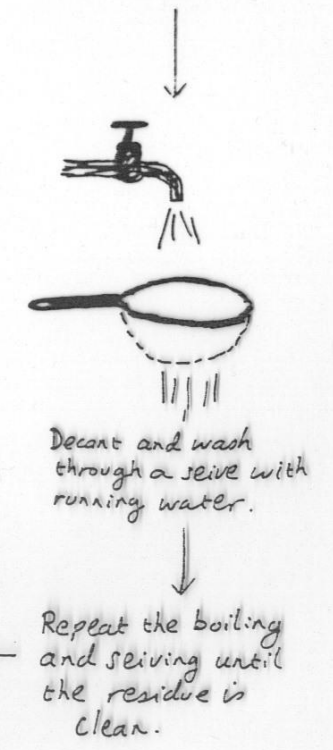
Set your binocular microscope up in the same way as a pair of binoculars: there will be one fixed lens and one adjustable. Set up the fixed lens by closing the opposite eye and focus using the main focusing knob. Then close that eye and focus the adjustable lens using the adjusting ring. The both eyes will be in focus and you should avoid eye strain. Take breaks – 10 minutes per hour. If you get eyestrain, a headache or any aches – stop!

# Summary :-



## The collection and preparation of Microfossils.

(from soft sediments)



\* Do not use an aluminium saucepan !!

Equipment for use in the kitchen and at home for finding microfossils–

Kitchen scales

Scientific sieve

A sauce pan – not aluminium!

Washing soda

Lots of water

Swirling thing on your tap

A funnel

Coffee filter papers

Clean sample bags

Binocular microscope

Desk and comfortable chair at the right height

A reading lamp (as light source)

“picking” tray

Pair of tweezers

Fine artists’ brush

Old bottle top for water to wet your brush

Sample tubes or cavity slides

Further reading -

Starting a small fossil collection ***Humber Geologist*** no 12-  
<http://www.hullgeolsoc.co.uk/microf1.htm>

Notes from my Microfossils night class  
<http://www.hullgeolsoc.co.uk/geocomic.htm>

Brasier MD, 1980 - *Microfossils*, George Allen & Unwin.