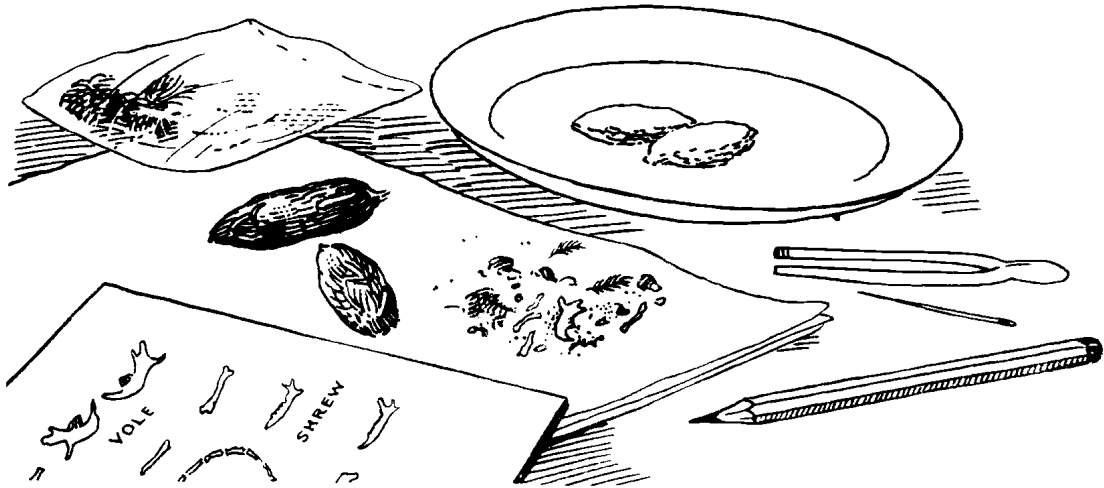


Owl pellets - How to study their contents



What are pellets?

- ?? Pellets are small, sausage-shaped objects, containing the undigested parts of the birds' food which are ejected through the mouth.
- ?? Pellets do not pass through the intestine of birds and are quite different from droppings. They do not smell, and are not unpleasant to work with.
- ?? They consist of things like the bones of birds, mammals and fish, teeth, claws and beaks, insect head parts and wing cases, seed husks etc. These are usually enclosed by softer material like fur, feathers and vegetable fibre.

Which birds produce pellets?

- ?? Most birds produce pellets. The more indigestible material there is in the food, the more pellets are produced.
- ?? The best known birds that produce pellets are the owls and the daytime-hunting birds of prey (raptors).
- ?? Owl pellets are the easiest to find and study, because they often collect beneath a favoured feeding post or roost.



How are pellets produced?

- ?? An owl will often swallow its prey whole. If it is too large to swallow, it can be pulled apart with the strong, hooked beak.
- ?? Once the food is swallowed, it passes first down to the gizzard, where the food is broken up, and then on to the stomach for digestion. Some of the harder parts of the prey are not (or only partly) digested.

- ?? These solid remains are prevented from passing any further down the gut. Instead, they are squeezed in the gizzard into a compact mass. This is then coughed up, or regurgitated as the pellet.
- ?? Owls normally produce two (sometimes three) pellets each 24 hours. It takes about six to eight hours between prey being eaten and any undigested remains being ejected from the mouth as a pellet.

Why study pellets?

The pellet contents are valuable, because, with a bit of detective work, we can get a great deal of information about the bird that produced it. The solid remains contained in owl pellets are hardly affected by digestion. They can be easily be extracted and identified, sometimes very precisely. The species of small mammals are easy to identify by their skulls and jawbones, and sometimes from other bones.

- ?? We can identify precisely what the bird has been feeding on. This is difficult enough with any bird, especially with a night hunter like an owl.
- ?? We can get clues to the owl's hunting habits from the prey it has taken.
- ?? We can estimate the numbers of different kinds of prey it takes.
- ?? If we find out more about the the prey animals, we learn a great deal about food chains and the exact part the owl plays in them.
- ?? We can get a great deal of information about the different small mammals and where they are found. This kind of information would otherwise be very difficult to discover.

Finding and recognising pellets

Pellets from owls are the easiest to find and study, particularly barn, tawny and little owl, if these live in your area. This guide will mostly concentrate on these, and the two commonest day flying birds of prey, the kestrel and sparrowhawk.

Finding pellets requires knowing a little about the habits of the bird. Most pellets are produced at the bird's roosting place. These are the easiest pellets to find. Collecting pellets can be very time consuming at first, but once you have located the 'pellet stations', it is possible to collect material regularly over long periods. If you know the species of bird the pellets are from, the results from the collection will be much more valuable.



intact.

Barn owls frequently roost and nest in the shelter of farm buildings, especially older ones. They are also fond of very old oak and ash trees. Dense white droppings are often a good clue to the bird's presence. Search on the floor or ledges beneath any available perch, especially where you can see the droppings. The pellets are easy to recognise. They can be quite large (30-70mm long), smooth and rounded. They are characteristically black in appearance (regardless of the colour of the prey it has eaten) often with a varnish-like gloss when fresh. They are very solid pellets, with the material highly compressed. They are also the best material for pellet studies. Many pellets are produced at the same site in the dry, providing a good supply. The bones they contain are remarkably

Tawny owl is the commonest owl in Britain, although it is not found in Ireland. You will know from the calls at night if tawny owls are present. They live in wooded areas or even in towns if there are enough trees. Daytime roosts are usually close to a tree trunk, often in tall mature conifers. Search the ground within a metre or two of each likely trunk. Again, very white droppings may give a clue to the site. Tawny owl pellets are usually greyer and more obviously 'furry' than those of the barn owl. They are medium sized pellets (20-50 mm long) with a bumpy surface. The shape is long and narrow, but irregular and they tend to taper at one end. They are far less solid than barn owl pellets, and often break into fragments as they hit the ground. Since they are in the open they weather quickly, and the bones may be very prominent. They often contain sand, which may indicate earthworms in their diet. Tawny owls change their roost site frequently. They may also produce some of their pellets while out hunting. This makes them much harder to collect in any quantity. The bones they contain are more damaged by digestion than those in barn owl pellets.



Little owls may be seen perching on the dead branches of trees in hedgerows, parks and similar places. They often prefer to roost in very old oak and ash trees and are particularly fond of old willow pollards. Little owls are not common in Scotland and do not occur in Ireland. The pellets are small (15-40 mm long), elongated and pointed at one end. They are very light, and if pressed, may either crumble or feel spongy. Colour and content vary with diet. They often show insect remains such as wing cases. Again, because they are out in the open, they will quickly become weathered. They can be confused with kestrel pellets.

Short-eared owls are rare birds, and their pellets can be very difficult to find. The best time is in the winter, when they hunt over coastal grazing marshes. It may be possible to find a pellet along the rough grassy embankment of a sea wall. They very seldom occur in Ireland because there are no voles. The pellets are medium to large (30-60 mm long) in size. They are elongated, rounded at one end and tapered at the other. They are grey with a slight sheen and very lightweight, but strong and don't break up as easily as many of the other pellets.

Long-eared owl are also rare birds, and so it can be very difficult to find the pellets. In the winter they often roost in thick thorn hedges or conifers in farmland, scrub and woodland edge. These roosts are often used traditionally year after year and can be shared with up to ten birds. Therefore, a large number of pellets may be found in one place. The pellets are slightly smaller than those of the short-eared owl. They are long, irregular and very slender. Unlike other 'brown owls' they breed in Ireland.

Kestrel pellets may be found when searching for those of owls, and can be confused with little owl pellets. They can be found beneath the eaves of buildings and below pylons and dead branches of trees - anywhere where a kestrel might perch or roost. The pellets are distinctive. They are small (20-40 mm long), pale grey (when dry) and with a rather 'felty' texture. They are also slightly flattened and pointed at one end. Kestrels, like other raptors, digest their prey more thoroughly than owls. Their stomach acids are stronger, which means that bones in particular are much less evident in pellets. They also tend to tear their prey up rather than swallow it whole. So expect to find fewer, more fragmented bones. Because they also take a high proportion of insect prey, kestrel pellets really require different methods of study from those described for owls.

Sparrowhawk is our most abundant day-flying bird of prey. Since they roost in trees, sparrowhawk pellets are often found when looking for owl pellets. They have regular 'plucking posts' where they take their prey before eating it. These would be good places to look for pellets. The pellets are small and

compact (25-35mm long), rounded at one end and tapered at the other. The main ingredient is feathers, but bones are only rarely found.

What equipment do you need to dissect pellets ?

You will need:

- ?? Fine tweezers or forceps, cocktail sticks, straightened wire paper clips etc.
- ?? Small pot (e.g. margarine tub) for soaking pellets and cleaning the items removed from them.
- ?? A few drops of antiseptic or disinfectant (preferably one that doesn't go cloudy when water is added, e.g. Savlon).
- ?? Newspaper for blotting excess moisture from pellets and their contents.
- ?? A hand lens or other suitable magnifier (preferably x8 or x10). Best of all would be a dissecting microscope.
- ?? A shallow dish or a tray to dissect the pellet on.
- ?? Card and glue for mounting your finds.
- ?? Gloves to wear when handling and dissecting pellets. Surgical gloves (available from chemists) or thin rubber gloves are ideal.

How to dissect a pellet?

Pellets can be teased apart when they are dry, but it is best to soak them first. Half fill the pot with water and add a few drops of disinfectant. Place the pellets in the pot. Soak them for about half an hour until they sink. Take them out and blot off excess water.

Tease each pellet apart very carefully using tweezers and cocktail sticks. Search carefully as you go so that nothing is missed.

As you find any bones or other items, remove them from the pellet. Clean them up and place them on the newspaper to dry.

As you search, take note of the basic material, or matrix, of the pellet. Is it mainly fur or feathers, or something else? It will give you a good idea of what to expect.

Do not be surprised to find small white live grubs. They are the larvae of clothes moths, and they feed on the fur or feather material of the pellet. Owl pellets must be one of the original homes of clothes moths, long before there were any clothes!

The remains of small creatures such as insects are often found in pellets, and in little owl and kestrel pellets these can be particularly abundant. To find and identify them often requires a dissecting microscope.

How to identify the pellet contents?

The keys at the end of this guide will help you to identify the contents of the pellets.

1. The basic material (Matrix)

Fur will lead you to expect mammal remains. It may even keep its colour and help you to recognise the species.

Feathers often break down into a loose powder, but you can still usually find small quills, the central stem of the feathers. They alert you to look for bird remains.

Sand or soil usually indicates earthworms. You will need to use a microscope to find the minute bristles called chaetae which confirm this.

2. **Bones**

Some bones are especially useful for identifying the species of prey. In this guide we use the bones of the head - skull and jawbones - as the means of identifying species. When you have found and cleaned them, try and work out what they are by using the key to skulls. A few other bones are good indicators of species. The most important of these are shown in the key.

Sometimes it is interesting to know the origin of each bone, and what part of the body it is from. We have included a diagram, which illustrates the bones of a typical small mammal, and shows where in the body they are found.

3. **Other remains**

Some insect remains are fairly easily recognisable, for example the wing cases of beetles. Other hard parts which survive include legs, jaws and even complete heads. Some of these are illustrated in the key.

How to display the pellet contents?

Have a piece of card handy for each pellet. Write on the top of the card the name of the bird that produced the pellet, and the date and place where it was collected. Arrange all the articles from the pellet that you have identified onto the card and stick them in place with strong glue. Beside each of the remains, write the name of the animal from which it came. If you wish, you can include the soft material of the pellet on the card, fully dried and suitably labelled, in a small polythene bag.

What do pellets tell us about the bird?

Once you have identified the contents, you can use the results to discover a great deal about the habits of the bird.

When does it hunt?

Some mammals are active during the day as well as by night. Others, especially the wood mouse, are strictly nocturnal. You may be able to discover whether a bird hunts by day or by night.

Where does it hunt?

Small mammals prefer certain kinds of habitat. The field vole lives in grassland, the bank vole in woods and hedges. Such creatures will give you clues as to where the owl was hunting.

How much does it eat?

You can work out the number of animals in each pellet from the number of skulls or jawbones. Some people prefer to count the number of pelvic bones, in case the head of the prey was not swallowed. Remember that an owl probably produces two or three pellets each 24 hours.

Does its diet change with the season?

If you can find enough pellets at different times of the year, you may find some interesting differences.

What part does the owl play in the food chain?

Find out what the prey animals eat. Some are vegetarian, like voles. Others eat only animal food, like shrews which feed on insects and other small creatures.

You can construct a diagram of a food chain from your results.

IMPORTANT CAUTIONS

- ?? The bird's welfare must always come first. NEVER disturb a site where a bird of prey may be nesting, or disturb roosting birds. All birds are protected by law, and there are special penalties for disturbing a barn owl close to its nest.
- ?? Pellets can sometimes be confused with droppings, especially of fox. Droppings are unpleasant to handle, so take care. If in doubt, leave well alone. Fox droppings are usually pointed at the end, the points having a twist in them.
- ?? When you go searching for pellets, always tell someone where you are going and when you expect to return.
- ?? Old buildings can be VERY DANGEROUS. You should always ask for a permission to enter them, and never visit them on your own. Never take unnecessary risks.
- ?? Pellets go mouldy very easily if they are kept in plastic bags or tubs. Store them in paper or cardboard containers.
- ?? Pellets are the ancestral home of clothes moths, so they are best stored out of doors. Keep your collection in a sealed container with tissue paper to absorb moisture if you bring them indoors.
- ?? It is a good idea to wear surgical gloves when handling and dissecting pellets.
- ?? Always wash your hands thoroughly after you have handled pellets.
- ?? Always throw away used cocktail sticks, or keep them for future use in a labelled container.

The RSPB

The RSPB aims to conserve all wild birds and the places where they live - their habitats. When their habitats are under threat, so are the birds. If the habitat is damaged, all animals that depend on it will suffer. This is because we all share the same air, water and sources of food.

The RSPB manages over 150 nature reserves in the UK where we provide the right habitats for wild birds to breed and feed in safety. We work to protect wild birds that do not occur on nature reserves by working with politicians, landowners and the police.

RSPB Education produces a range of classroom resources suitable for primary and secondary teachers. All are linked to the UK national curricula. Ask your teacher to send in to the RSPB Education Department at The Lodge for our free, illustrated Education Catalogue.

RSPB Phoenix is the teenage membership of the RSPB, and is the club if you want to know more about birds and nature conservation. There are local groups, holidays, and special events. There is a colourful quarterly wildlife magazine *Wingbeat*. Write to Phoenix at RSPB, The Lodge, Sandy, Bedfordshire SG19 2DL or e-mail at Phoenix@rspb.org.uk if you would like to know more.

The RSPB website at www.rspb.org.uk has lots of exciting information about birds and the environment, and classroom resources for teachers.

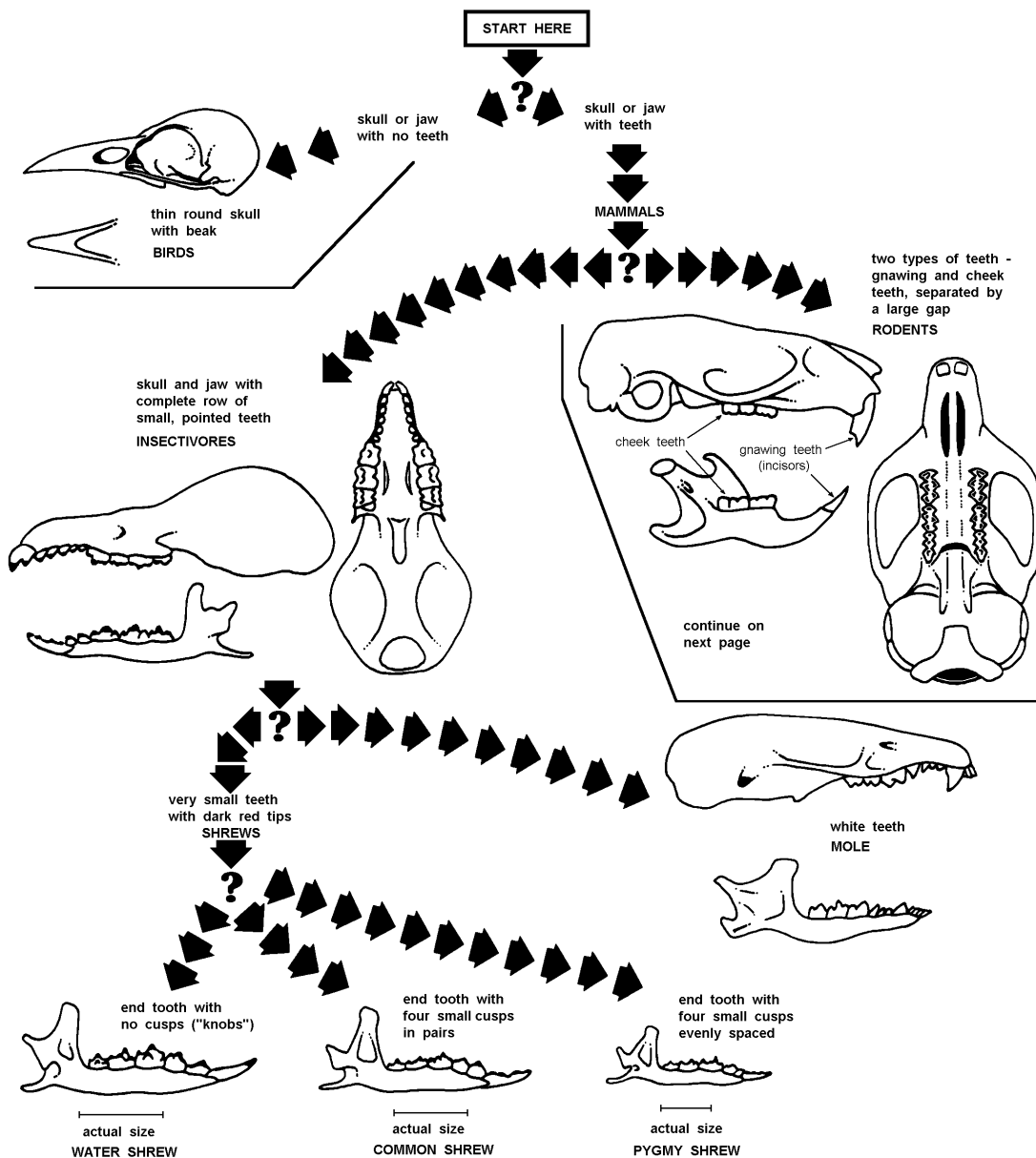
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KEY TO THE REMAINS OF SKULLS AND JAWS FOUND IN OWL PELLETS

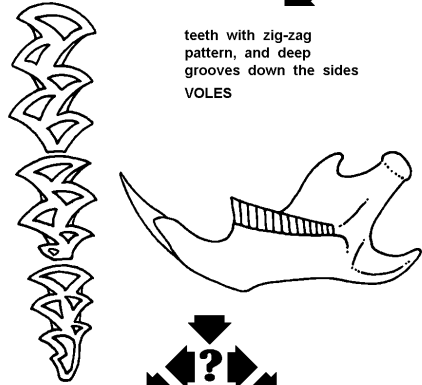
How to use the key:

At each stage of the key there are two or three statements. Find out which one fits the bone you are examining. this will tell you which arrow to follow. You will be led to either further questions or the name of the animal you have found.

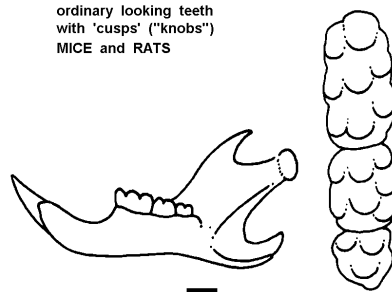
Note Skulls are illustrated whole, but the hind portion is almost always separated in owl pellets.



Make sure the surface of the teeth is clean and free from fur



teeth with zig-zag pattern, and deep grooves down the sides
VOLES



ordinary looking teeth with 'cusps' ("knobs")
MICE and RATS

small jaw (measure against scale)
actual size

large jaw (measure against scale)
actual size

large jaw (within range shown)
actual size

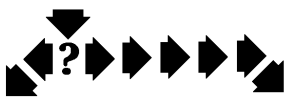
small jaw (within range shown)
actual size

VOLES

WATER VOLE

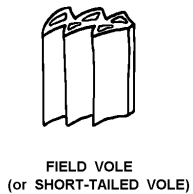
BROWN RAT

MICE



Teeth with sharp zig-zag pattern. Pull out a tooth. Grooves run all the way down. No roots.

Teeth with more rounded zig-zag pattern. Pull out a tooth. Grooves do not run all the way down. Tooth ends in two small roots.



FIELD VOLE (or SHORT-TAILED VOLE)



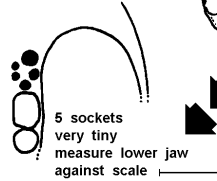
BANK VOLE

Find this part of the skull (it may have fallen apart). Gently pull out the first tooth to show the root sockets.

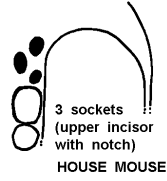
ACTUAL SIZE



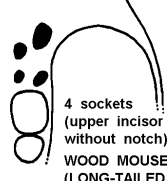
ROOT SOCKETS



5 sockets very tiny measure lower jaw against scale
HARVEST MOUSE



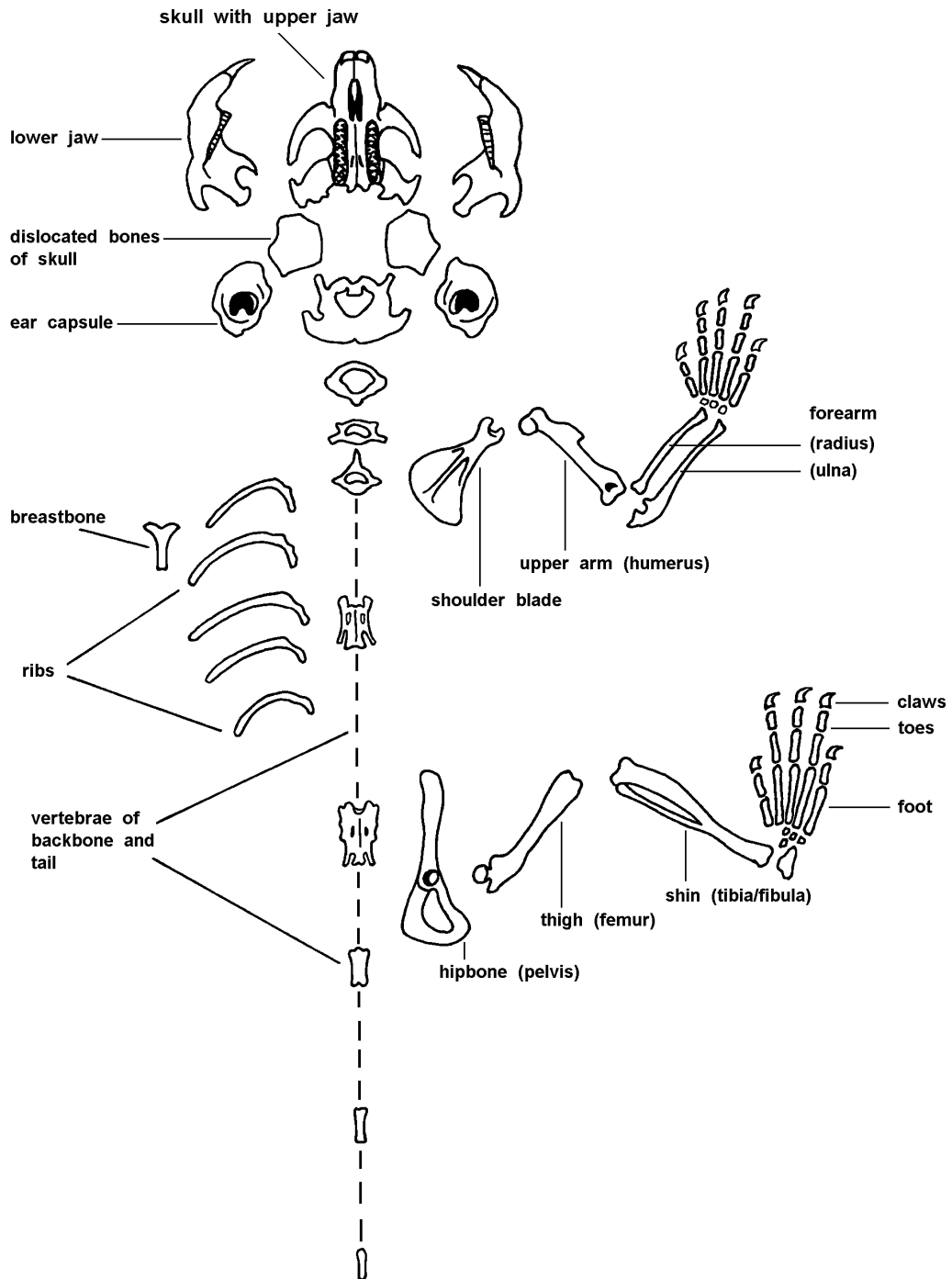
3 sockets (upper incisor with notch)
HOUSE MOUSE



4 sockets (upper incisor without notch)
WOOD MOUSE (LONG-TAILED FIELD MOUSE)

THE MAIN BONES OF A TYPICAL SMALL MAMMAL (a vole)

Only selected main bones are shown. Bones from different species will differ in detail



SOME OTHER ITEMS YOU MAY FIND IN A PELLET. These are not drawn to same scale, and most are magnified.

