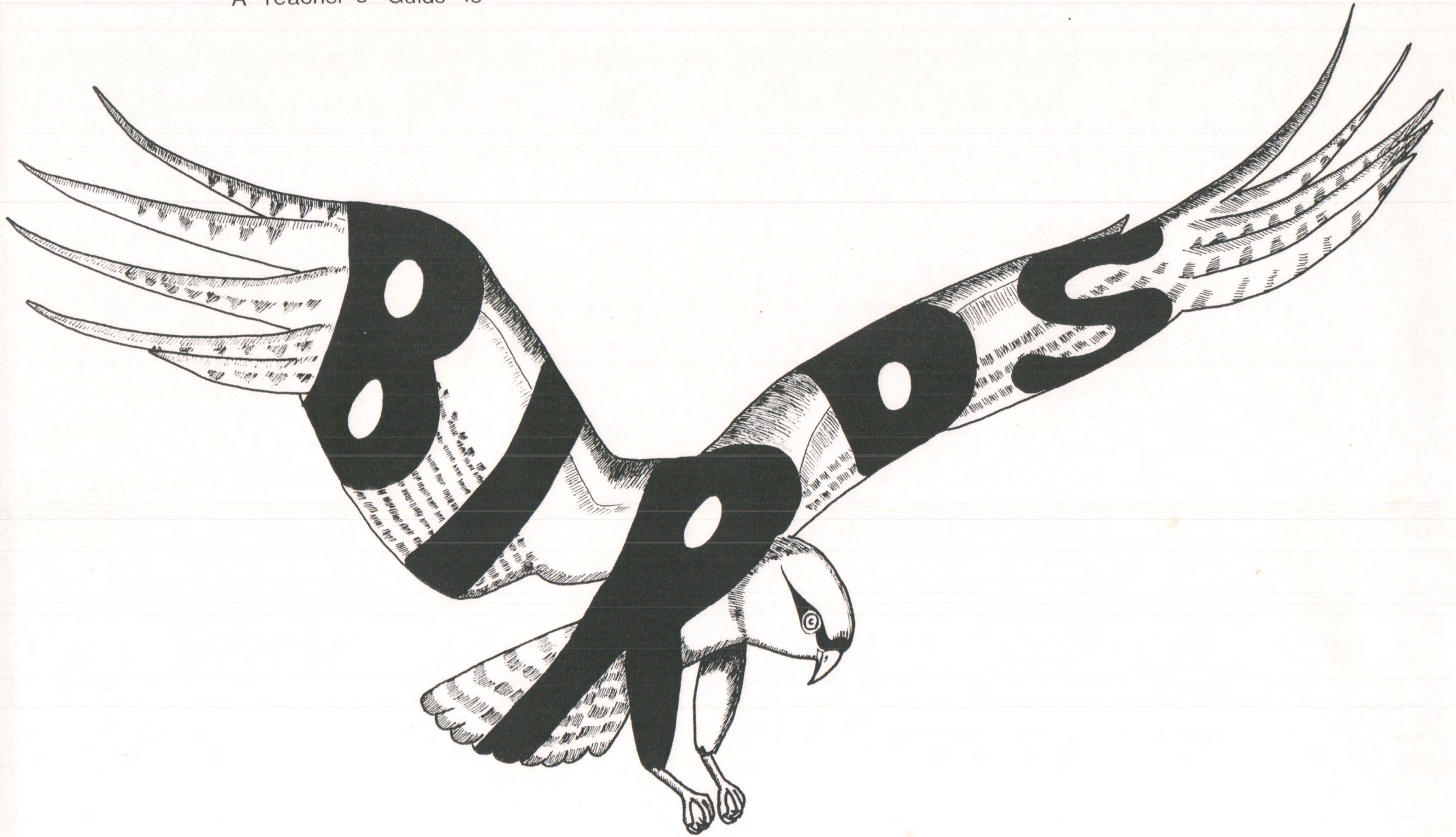


A Teacher's Guide To



At Pencynor Wildlife Park.

Introduction.

This teachers guide is aimed at Junior School teachers who may wish to do a project on birds and/or flight. It also aims to show the diversity of bird adaptations and to give ideas and information relevant to the science and the design & technology subjects of the National Curriculum.

PAGE

CONTENTS

- 1 INTRODUCTION - WHAT'S A BIRD?
- 2 FLIGHT - 1
- 3 FLIGHT - 2
- 4 FLIGHTLESS BIRDS
- 5 FEEDING
- 6 FEET
- 7 SENSES
- 8 NESTS AND EGGS
- 9 COLOUR AND PATTERN
- 10 CONSERVATION
- 11 THINGS TO DO
- 12 BIRDS AT PENSCYNOR

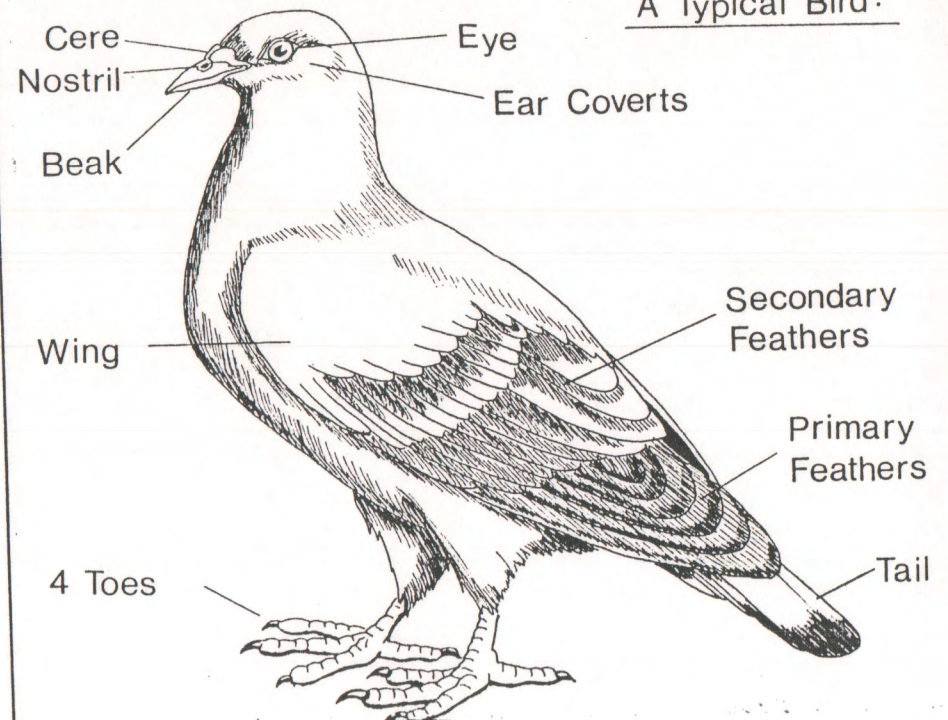
Reproduced on recycled paper.

What's A Bird?

Birds : have feathers
a beak
are warm blooded
lay hard-shelled eggs
can fly (with a few exceptions).

There are some 8,600 living species of bird today, showing a great variety of features to survive in different habitats.

A Typical Bird.

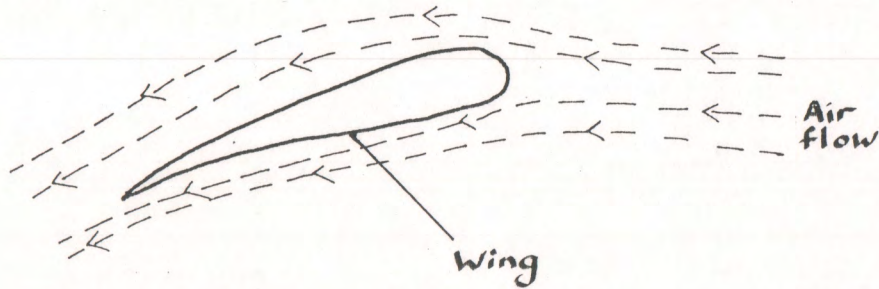


Flight ~ 1

Air currents are the secret to flight. Without them the birds (or anything that flies) would simply plummet to the ground.

FLYING

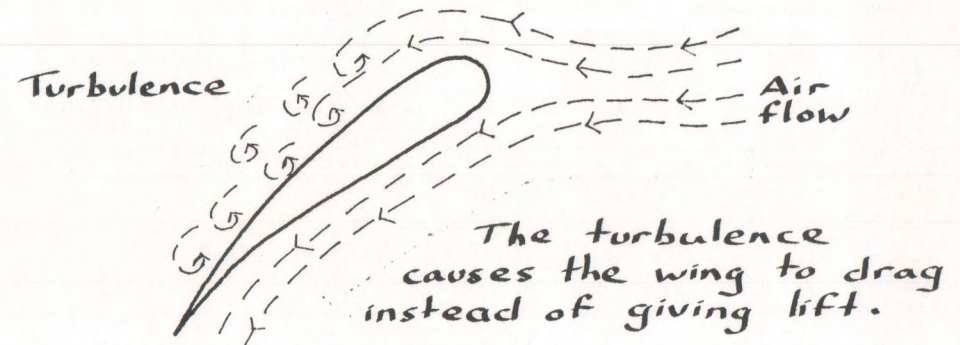
The air current above the wing creates a suction.



Air under the wing creates a pressure, pushing the wing up - giving lift.

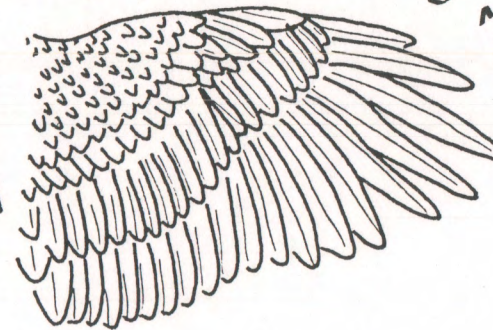
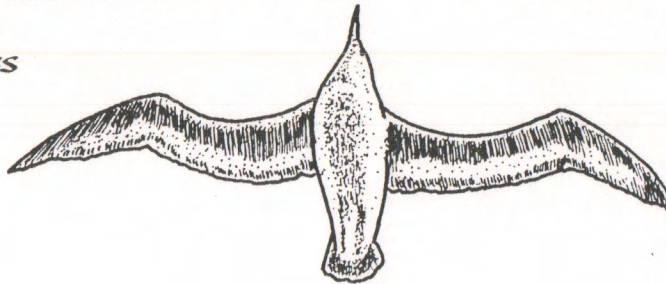
STALLING (landing)

Tilting the wing causes air turbulence.

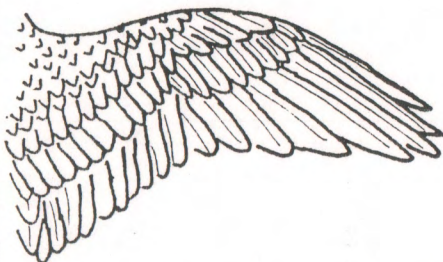


DIFFERENT TYPES OF FLIGHT are obtained by different wing shapes:

Gliding - the albatross has long, thin wings for soaring on air currents with little effort.

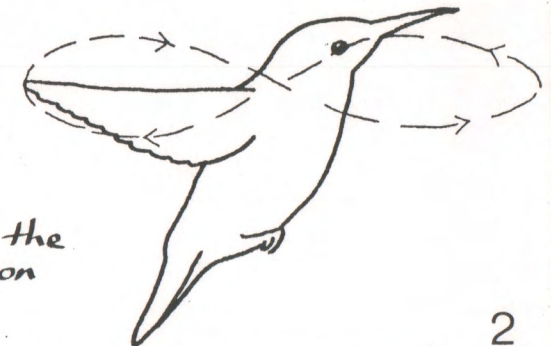


Manoeuvring - hawks have broad wings with the primary feathers arranged to make fingers. Flight is slow, but ability to change direction is excellent.



Speed - falcons' wings are long and narrow to give little wind resistance.

Hovering - hummingbirds' wings are almost rigid and swivel at the shoulder. When hovering the wings flip over at the end of the forward stroke giving lift on the back stroke too.



Flight ~ 2

There are two theories to why birds developed flight : a) to catch prey such as insects, and b) to escape predators.

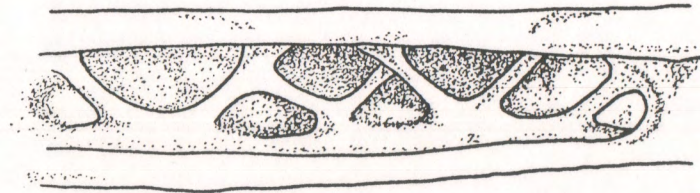
Flight is achieved by - being light (birds bones are thin sheets or hollow; they have no teeth, little body fat, and the young develop outside the body).
- being powerful (birds have high performance muscular, digestive and breathing systems).

Muscle Power



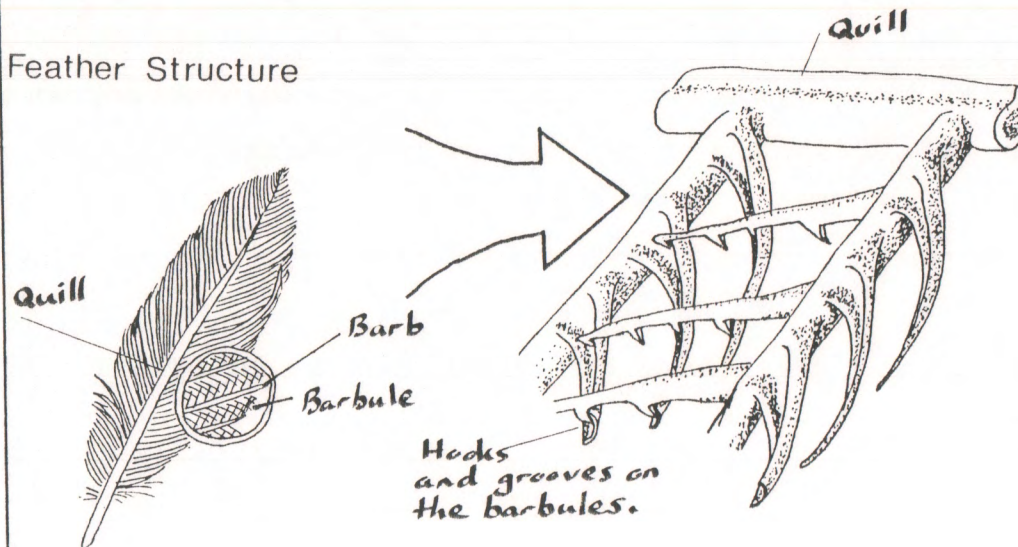
Large, keel-shaped breast bone (sternum) for flight muscles to be attached to.

Light, Strong Bones



This shows the structure inside the hollow wing bone - this allows strength with a light weight.

Feather Structure

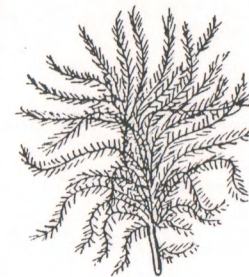


Types Of Feather

There are basically three types :



Down feather



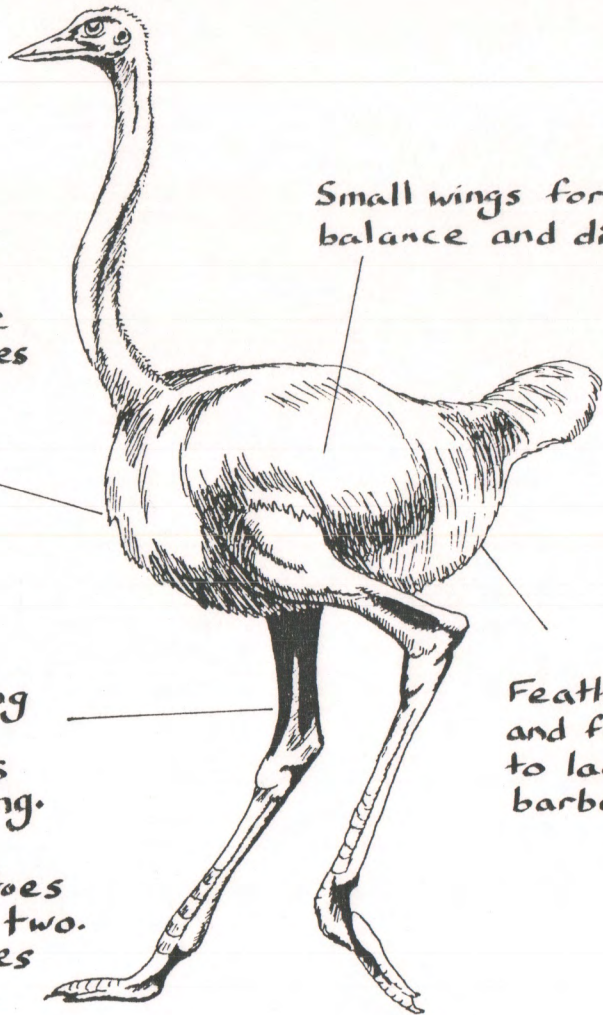
Number of feathers depends on the size, species and sex of the bird. A Whistling swan has 25,000 feathers, a Hummingbird only 900.

Flightless Birds.

About 40 species of bird living today have given up flight to live on the ground or to swim.

RATITES are birds such as the Ostrich, Rhea, Emu, Cassowary and Kiwi. These birds specialise in running.

Ostrich



Small breastbone gives ratites a pear shaped body.

Small wings for balance and display.

Long, strong legs and short toes for running.

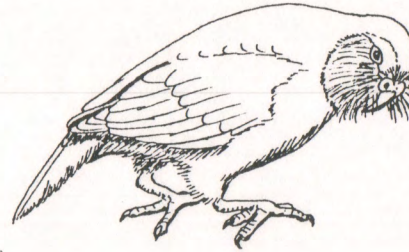
Number of toes reduced to two. Other ratites have three

Feathers loose and fluffy due to lack of barbules.

Ostriches can run at over 38 mph (60 kph).

KAKAPO.

These large, heavy parrots flap their wings when jumping from trees to the ground. This simply breaks the fall as they can not actually fly. Kakapos are agile climbers using their feet and beaks to help them. They are mostly nocturnal.



PENGUINS specialise in swimming.



Torpedo shaped body.

Large, strong chest muscles.

Webbed feet with legs set well back on the body for steering.

Wings are rigid sabre - thin paddles, for propelling the body through water.

Rudder - like tail.

Feeding.

Birds beaks are not usually very powerful, and having no teeth they must rely on digestion to break up the food (some birds swallow grit and small stones to help). Beaks are shaped according to the food eaten; here are some examples:



SONG THRUSH -
has a moderately long bill and so is able to eat fruit, worms, snails etc.

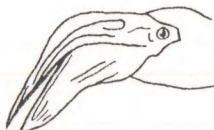


EAGLE -
short, sharp hooked beak for cutting and tearing flesh.

NIGHTJAR -
has a very broad and short beak which can be opened wide to catch insects at night.

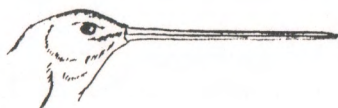


FLAMINGO -
using the seive-like lamellae on the sides of the beak, small shrimps (krill) and plants (algae) are filtered out and swallowed.



PARROT -
the upper mandible moves on the skull, and so gives a large gape and enough leverage to crush tough nutshells.

AVOCET -
has a long, thin beak to probe for worms and small molluscs from mud.



HUMMINGBIRDS -
can have long or short, straight or curved, thin beaks. They all have tongues with a special tubular tip for feeding on nectar.



CROSSBILL - extracts seeds from pine cones.

HORNBILL -
large, strong bill used to pluck fruit from trees.



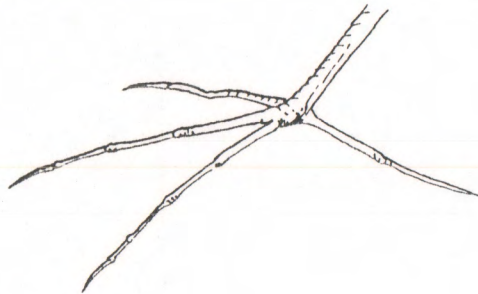
Feet.

Birds show a wide variety of foot adaptations for specialised habitats and ways of living.

WALKING.

These birds often have long toes in front and behind to give good balance.

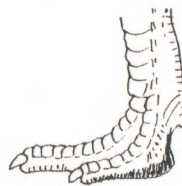
Jungle Fowl live on the forest floor. They have long claws for scratching out food from the top layer of the soil.



The Jacana or Lily Trotter walks on water lilies, and so has long toes to spread the body weight and prevent the bird from sinking.

RUNNING.

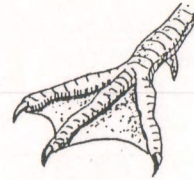
Ostrich has just two toes to be more efficient when running as this gives less drag.



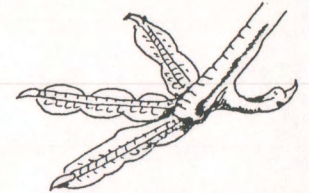
SWIMMING.

These birds have webbed feet, giving more surface area to push against the water and so move faster.

Duck



Coot - has lobes rather than webbing.



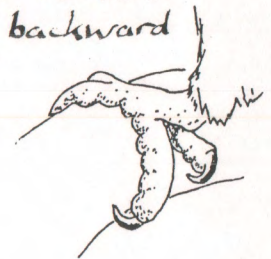
PERCHING.



The majority of birds have one digit pointing backwards to give a strong grip for perching on branches.

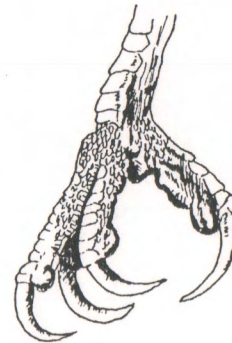
CLIMBING.

Two toes point forward and two point backward forming a pincer. This allows for a very strong grip. Parrots have feet like this.



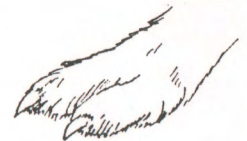
GRIPPING.

Birds of prey have long needle-sharp talons to seize and kill prey. Eagle has large powerful feet



WARMTH.

Ptarmigan feet are enclosed in a coat of warm feathers.



Senses.

SIGHT -

Birds depend more on sight than any other sense. In most birds the eye is broader than it is deep, but in those with very acute sight the eye is longer, giving good judgement of distance.

Position of eyes gives different fields of vision:



■ = binocular vision



Owl.
Has a small field of vision, but 70% is binocular vision.
Good for judging distance.

Woodcock.
Has a 360° field of vision - can see in all directions without moving its head. But has only 6% binocular vision.

SMELL AND TASTE

These are not very well developed in most birds. However, Kiwis which are nocturnal and terrestrial, have a good sense of smell. So do the Turkey Vultures of South America, as the best way to detect dead animals hidden in vegetation is by smell.

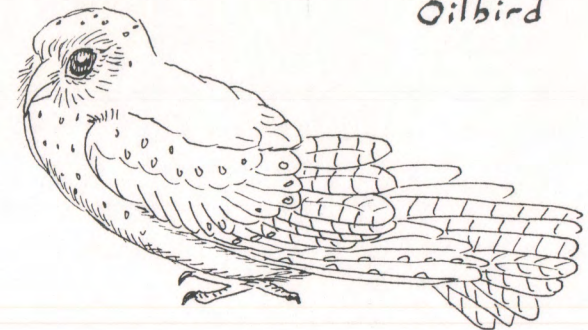


Birds' ability to taste is similar to our own.

SOUND -

Birds' internal ears are very similar to our own. The ear holes are usually covered by feathers, but can be clearly seen on Emus. Owls and other nocturnal birds have excellent hearing, they find their prey mainly by sound.

Some cave-dwelling birds use echolocation to avoid obstacles - eg. Oilbirds and Swiftlets. They emit clicks and listen for the echo much in the same way as bats.



Oilbird

Penguins are said to catch fish using sonar.

TOUCH

Birds are quick to react to touch on the plumage.

Some birds have touch-sensitive beaks to help them find food.
eg. Spoonbill

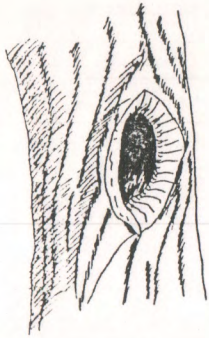
Some birds have touch-sensitive tongues eg. Woodpecker.

Finches can detect vibrations with their legs, so detecting approaching danger.

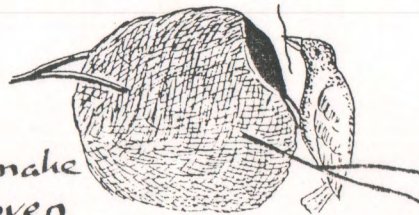


Nests And Eggs.

The style and shape of the nests and eggs depend on the habitat and lifestyle of the bird.



PARROTS - make nests of wood chippings in tree holes. Their eggs are round and white.



WEAVER FINCHES make hanging nests of woven grass on the ends of branches.



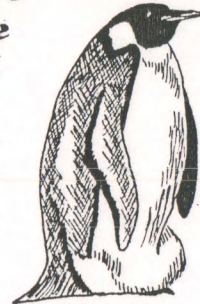
OSTRICH - these birds lay the largest eggs. The eggs are laid in a sandy dip in the ground; a number of females lay their eggs in the same nest, which is then guarded by one male. Both the male and females incubate the eggs.



GUILLEMOT - this sea bird makes no nest, the egg is simply laid on a cliff ledge. The egg is shaped so that it rolls in circles and not over the cliff edge.

CUCKOO - lays one egg into another birds' nest. The cuckoos' eggs change colour to look like those of the host bird.

KING PENGUIN - the female lays one egg which the male incubates by balancing it on his feet to keep it off the ice.



OVEN BIRD - makes oven-shaped nests of mud on the top of tree stumps and fence posts.

Warbler. Cuckoo. Wagtail. Cuckoo.



DID YOU KNOW?

Smallest egg (laid by the Bee Hummingbird is only 1.2 cm long and weighs 5.1 g.

Largest egg (laid by the Ostrich) is about 18 cm long and can weigh 1.6 kg.

The American Bobwhite holds the record for largest clutch - laying 12 to 24 eggs.

The Great Wandering Albatross has the longest incubation period of 75 to 82 days.

The biggest tree nests are made by Bald Eagles, they are 2.9 m wide and 6.1 m deep.

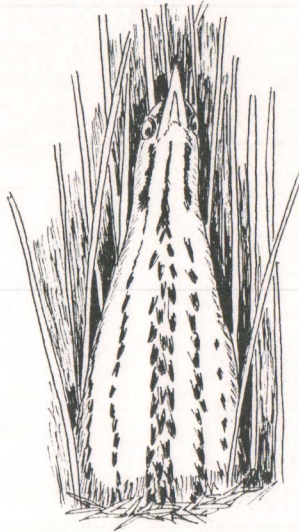
The world's smallest nest, made by the Bee Hummingbird is the size and shape of a thimble.

Colour and Pattern.

CAMOUFLAGE.

Many birds, especially the ground-dwelling ones, are coloured and patterned to match the background so staying hidden from predators.

Eg. Bittern in reed posture.



Some birds of prey are coloured to hide from

potential prey.

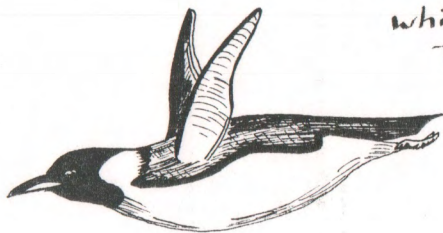
Eg. Snowy Owls are white to merge with the snow.

In the summer the female is more grey for camouflage when sitting on her stoney nest.



Countershading - many seabirds are white underneath.

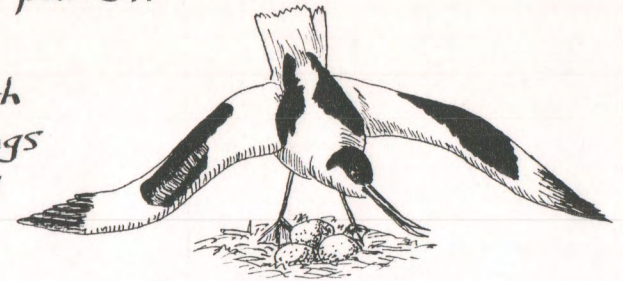
This makes them appear flat and more difficult to be seen from below.



COMMUNICATION.

Birds use colour and pattern to "say" things.

Eg. An Avocet with head down and wings spread is displaying aggressively. This means "Go away".



Birds will make themselves look bigger to intimidate intruders by spreading their wings and fluffing up the body feathers to show any bold patterns that they may have.

Chicks' brilliantly coloured mouths show the parent bird just where to put the food. The wide gape means "Feed me".



Many male birds are brightly coloured to attract females.
Eg. Peacock.

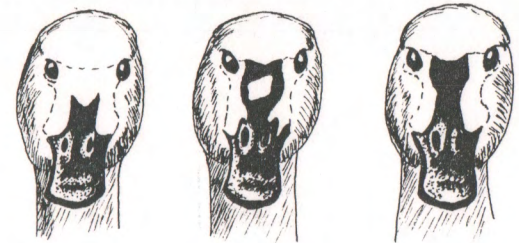
Eg. Cockatoos raise their crests and bob up and down.



IDENTIFICATION.

Different colours and patterns identify different species, different sexes and even individuals.

Eg. Each individual Bewick Swan can be identified as they each have their own different facial markings.



Conservation.

EXTINCT BIRDS -

extinction is a natural process (eg. dinosaurs), but more recently many animals have become extinct at the hand of man. Over 120 species have become extinct since the late 18th century.



The Dodo - large flightless pigeons lived on the island of Mauritius. Hunted to extinction by sailors wanting fresh meat.

California Parakeet was the only north American parrot. Shot to extinction by farmers who regarded it as a crop pest.

Passenger Pigeon - millions of these flew over North America well into the 19th century, yet the last wild passenger pigeon was shot in 1900.



ON THE BRINK -

today over 440 species of bird are threatened.

Kakapo - this terrestrial parrot has been unable to compete with or defend itself from introduced animals to New Zealand.

Californian Condor - less than 30 of these birds exist today. Their numbers decreased due to shooting, poisoning and loss of habitat.

Reasons for decline in numbers of birds includes:

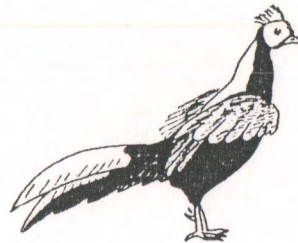
1. Loss of habitat
2. Shooting for sport, as pests etc.
3. Illegal trade (especially parrots and birds of prey)
4. Natural disasters.

SAVING BIRDS FOR THE FUTURE.

The Hawaiian Goose has been reintroduced to the wild after being captive bred by the Wildfowl Trust. Today there are over 2,000 on Hawaii, in 1950 there were only 50.



Swinhoes' Pheasant has been reintroduced to the wild after being captive bred by the Pheasant Trust. A native of Taiwan, its numbers had been falling rapidly.



Unfortunately it's not good enough to simply try to breed birds for reintroduction. Their habitat must be secured for the future and laws prohibiting/controlling hunting and trade must be made and enforced.

SOCIETIES TO JOIN:

R.S.P.B. The Lodge, Sandy, Bedfordshire SG19 2DL
Wildfowl Trust. Slimbridge, Gloucester.
W.W.F. 11-13 Ockford Rd. Godalming, Surrey.

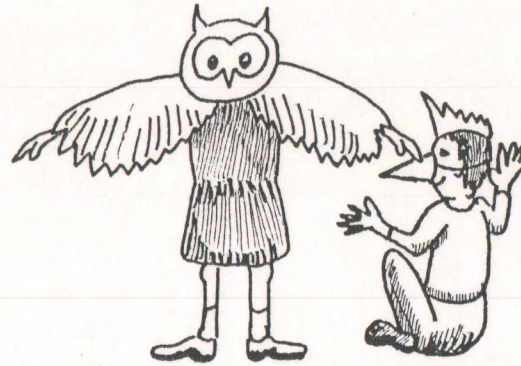
At Penscynor.

Things To Do

At School.

Draw different shaped :
birds wings
beaks feet

Listen to bird noises -
which ones sing, cluck,
squawk etc.
Why not record them on tape?



Compare the Emus with the Penguins
and Parrots.
What do they have in common?
What differences can you see?

Look out for young birds, especially in
spring and summer.

Take a paint catalogue (from DIY stores)
round and tick off the colours you see
on the birds.

Make paper aeroplanes with
different sized and shaped wings
for speed
gliding
manoeuvrability etc.

Compare these with bird wings.

Make bird mobiles.

Make bird masks.

Make your own nests.

Write bird poems.

Look at other animals which can fly -
eg. bats, butterflies, ladybirds etc.

USEFUL BOOKS

Burton J.A. (1984). Owls Of The
World. Peter Lowe.
Burton R. (1985). Bird Behaviour.
Granada.
Ellis M. (1971). The World Of
Birds. Hamlyn.
Lloyd G. & Lloyd D. (1979). Birds
Of Prey. Hamlyn.

Mitchel Beazley World Atlas
Of Birds. (1979). Mitchel
Beazley.
Webb, Wallwork & Elgood. (1979).
Guide To Living Birds.
Macmillan.
W.W.F. Focus On Birds. Manor
Park Press.

Useful Locations

The Zoo Centre is located next to Penguin Pool (7), between Burger Bar (4) and Waterfowl aviary (22)

1. Main Office
First Aid Point
Gift shop
Copper Kettle Coffee Shop
2. Toilets
3. Toy Shop
Ice-Creams
4. Burger Bar
5. Book shop / Sweet shop
6. Picnic Area

Enclosure key

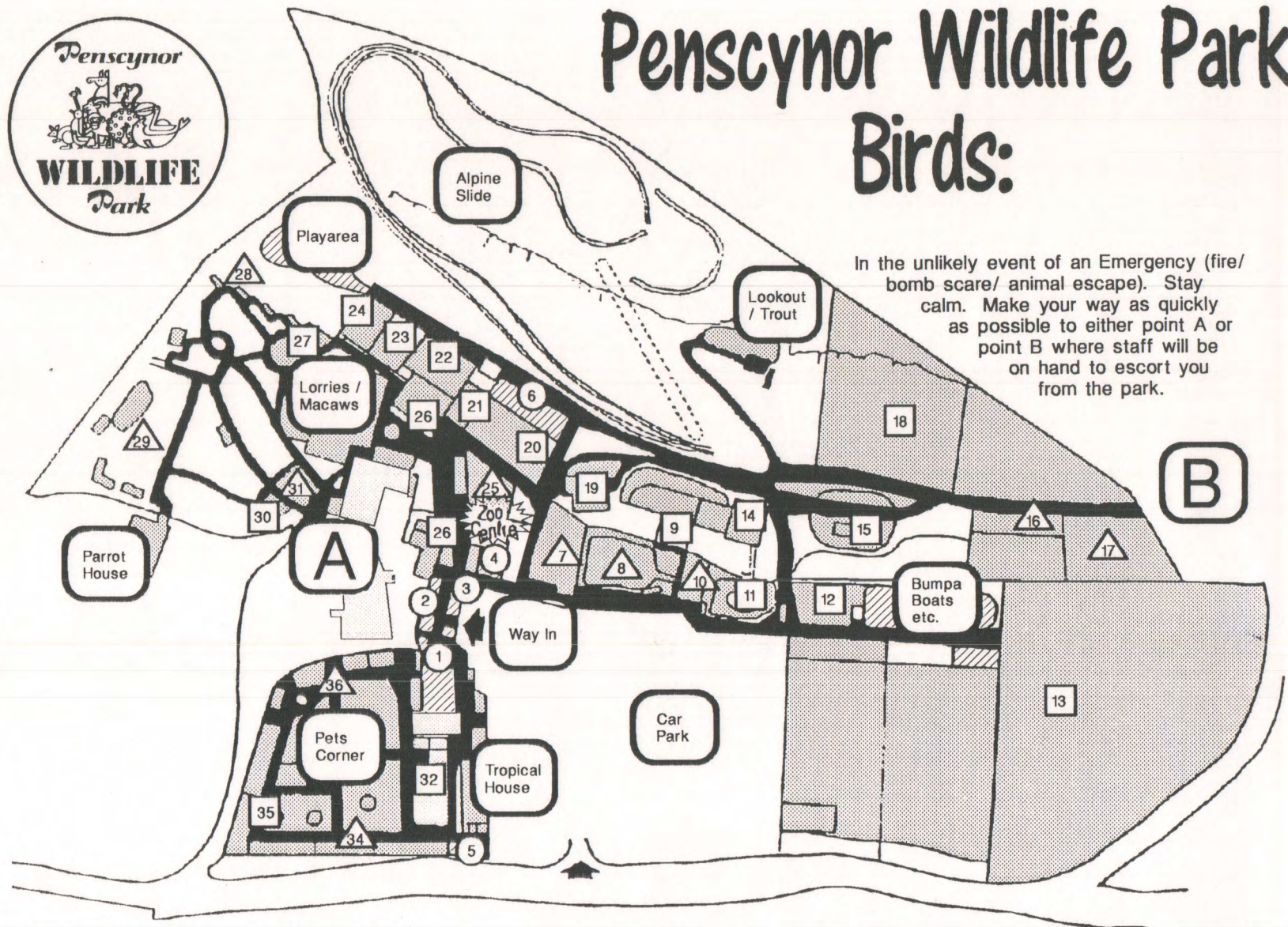
 = Birds

**Guide Books -
Available from
gift shops and
main entrance.**



Penscynor Wildlife Park Birds:

In the unlikely event of an Emergency (fire/ bomb scare/ animal escape). Stay calm. Make your way as quickly as possible to either point A or point B where staff will be on hand to escort you from the park.



7. Penguins Pelican
8. Waterfowl Trout Squirrel Monkeys
9. Chimpanzees
10. Scarlet Ibis White Fronted Wood-Duck

11. Gibbon Island
12. Meerkats
13. Shetland Pony Guanaco Deer
14. Black & White Ruffed Lemurs

15. Emperor Tamarin Island Trout
16. Rheas
17. African Crowned Crane
18. Wallabies Muntjac
19. Marmoset House

20. Prairie Dogs
21. Pygmy Goats
22. Western-Black & White Colobus
23. Lar Gibbons
24. Ring-Tailed Lemurs

25. Sacred Ibis Night Herons Silver Gulls Demoiselle Cranes
26. Sooty Mangabeys
27. Asian Short-Clawed Otters
28. Hillside Parrot Aviaries

29. Flamingos
30. Porcupines Mongooses
31. African Fish-Eagle
32. Eastern Black and White Colobus
33. There isn't a 33!

34. Mixed Aviaries
35. Farm Animals Rabbits Guinea Pigs
36. Mixed Aviaries