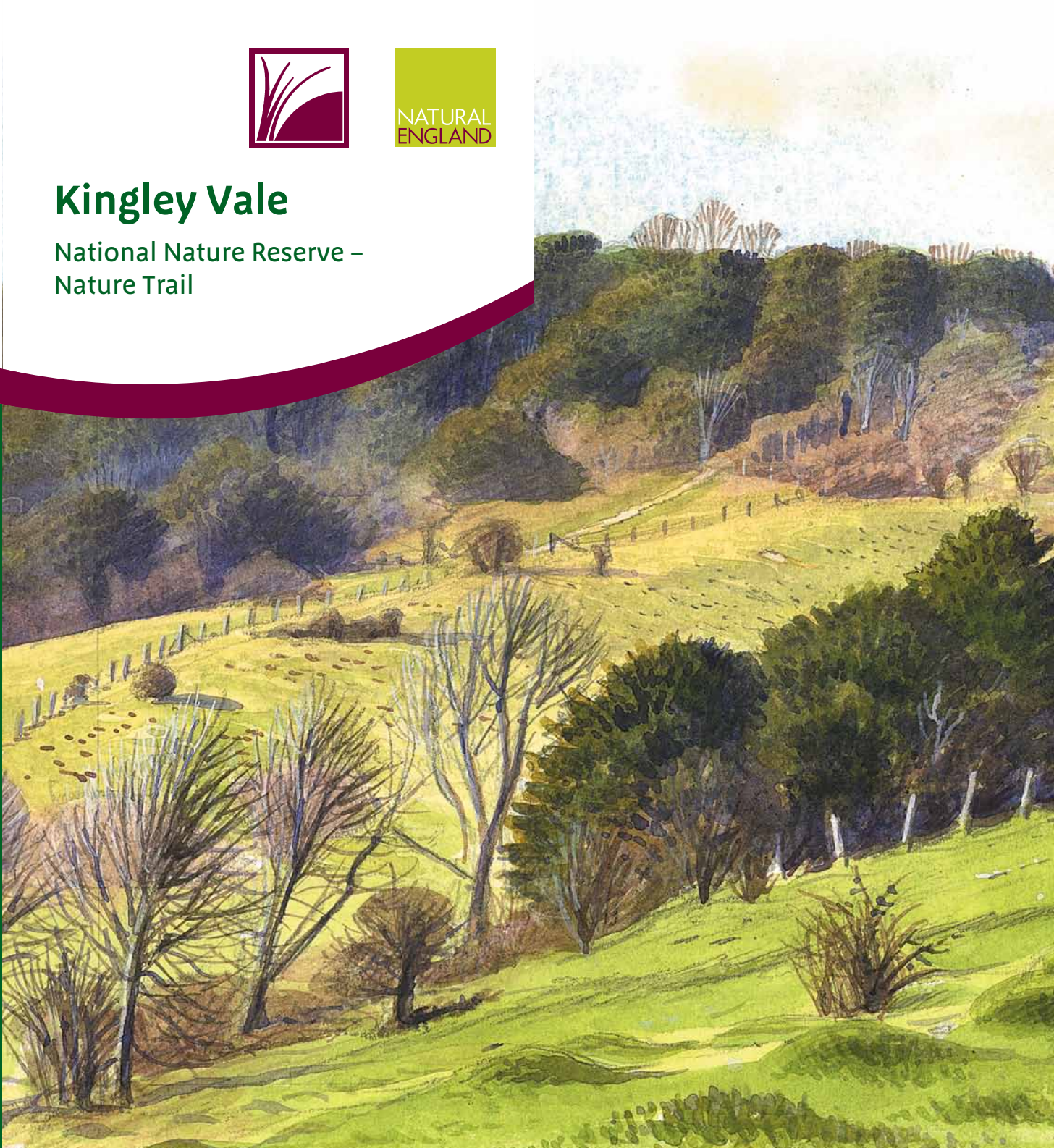
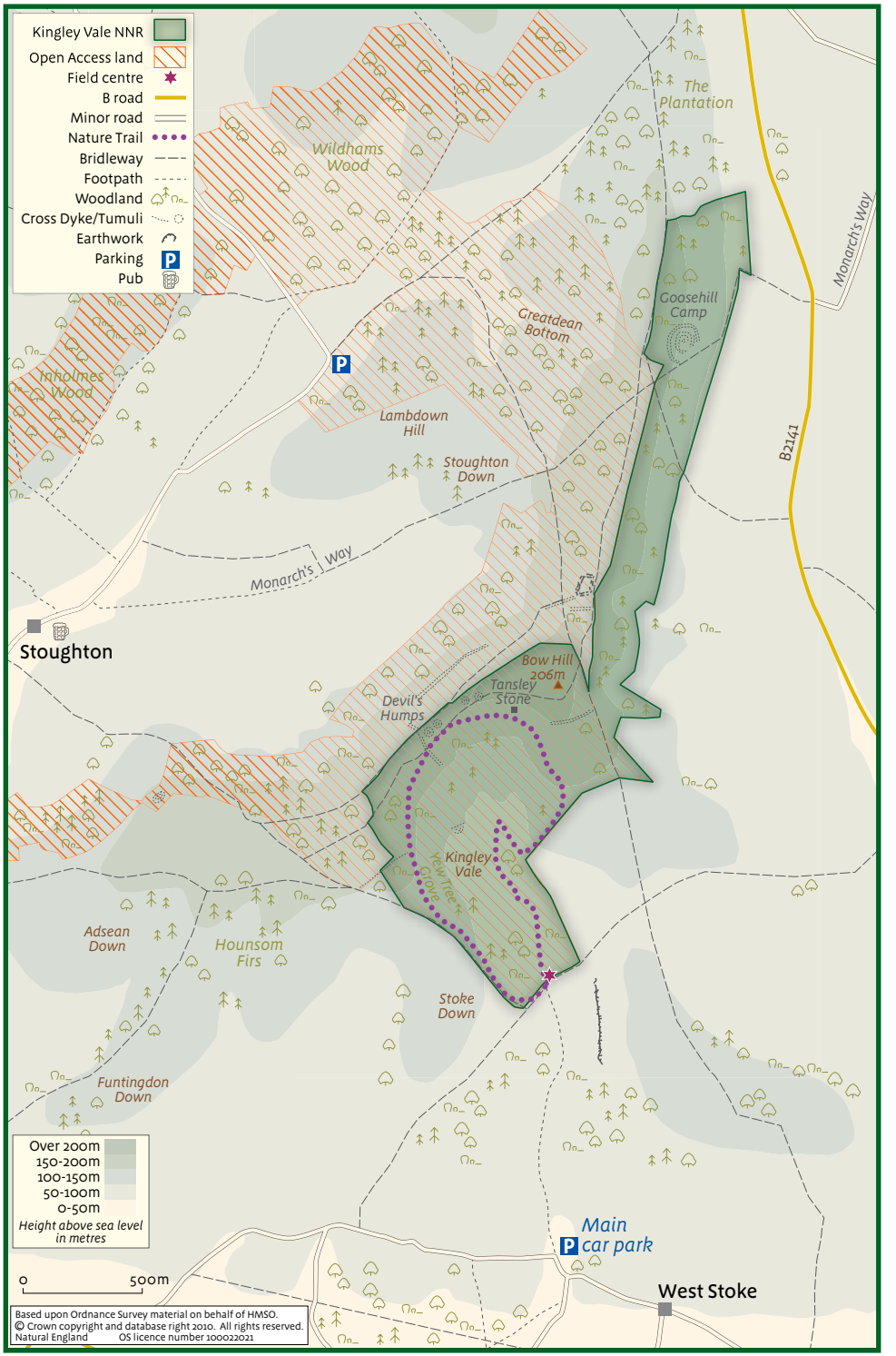
Kingley Vale

National Nature Reserve – Nature Trail




Kingley Vale NNR
Open Access land
Field centre
B road
Minor road
Nature Trail
Bridleway
Footpath
Woodland
Cross Dyke/Tumuli
Earthwork
Parking
Pub
Wildhams Wood
The Plantation
Monarch's Way
Goosehill Camp
Greatdean Bottom
Inholmes Wood
Lambdown Hill
Stoughton Down
B2141
Monarch's Way
Stoughton
Bow Hill 206m
Tansley Stone
Devil's Humps
Kingley Vale
Yew Tree Grove
Adsean Down
Hounsom Firs
Stoke Down
Funtingdon Down
Over 200m
150-200m
100-150m
50-100m
0-50m
Height above sea level in metres
0
500m
Main car park
West Stoke
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Early life in the vale

Millions of years ago, Britain lay far to the south of its present position and a warm shallow sea covered the land. The seas were full of sponges, ammonites, ichthyosaurs and sea urchins and strange fish were caught by flying reptilian pterosaurs. Many of the small animals and plants that lived in these seas, such as the coccoliths, contained calcium. When they died this material drifted to the sea floor. Gradually, over millions of years, it accumulated, eventually forming a deep layer. These sediments form the chalk on which you are standing. The sponges that lived in these seas produced skeletons of silica and fragments of these slowly dissolved, reforming into flint. As time passed the seas retreated and the continent, of which Britain is part, drifted north. In southern Europe, gigantic earth movements slowly thrust up the Alps and the last ripples of this 'Alpine storm' reached here, buckling the earth and pushing up the Downs.

Over the last two million years Britain has undergone a series of climatic fluctuations, including numerous Ice Ages when glaciers advanced from the north.

During the most severe Ice Age, known as the Anglian, Britain was covered by ice as far south as London. In southern England conditions were similar to the Arctic today, with short summers followed by long cold winters. Melting ice and snow, carrying rock fragments and sediment, drained through the river valleys eroding

the underlying bedrock and laying down the deposits on valley floors. The landscape you see today is the result of these processes.

At the end of the last Ice Age, the warmer climate allowed a variety of plants and animals to colonise the area. Humans now began to have a profound influence on the landscape through activities such as forest clearance.

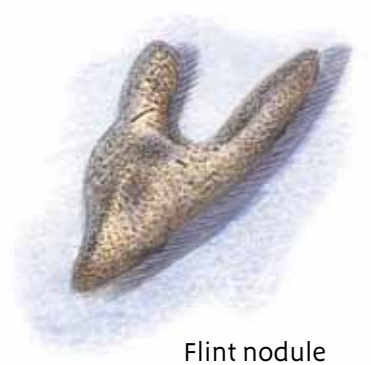
The Nature Trail follows numbered posts around the reserve. For each post there is a numbered question. The answers are in the back of the guide – pages 52-54.

Post 1

Soil

The type of plant life found in the valley is closely linked to the character of soil. Soil does not just consist of particles of rock but is a complex mixture of living and non-living things. There are three soil pits on the nature trail, showing the different soils found on the reserve.

In the first soil pit, in the valley, you can see the chalk fragments that were washed there by the melting snow in glacial times. Some of these rocks have been rounded by being tumbled in water.



Flint nodule

Notice that the soil in the valley is quite deep, as it has accumulated material that has come down from the slopes. This soil is known as combe rock.

Sea urchin fossil

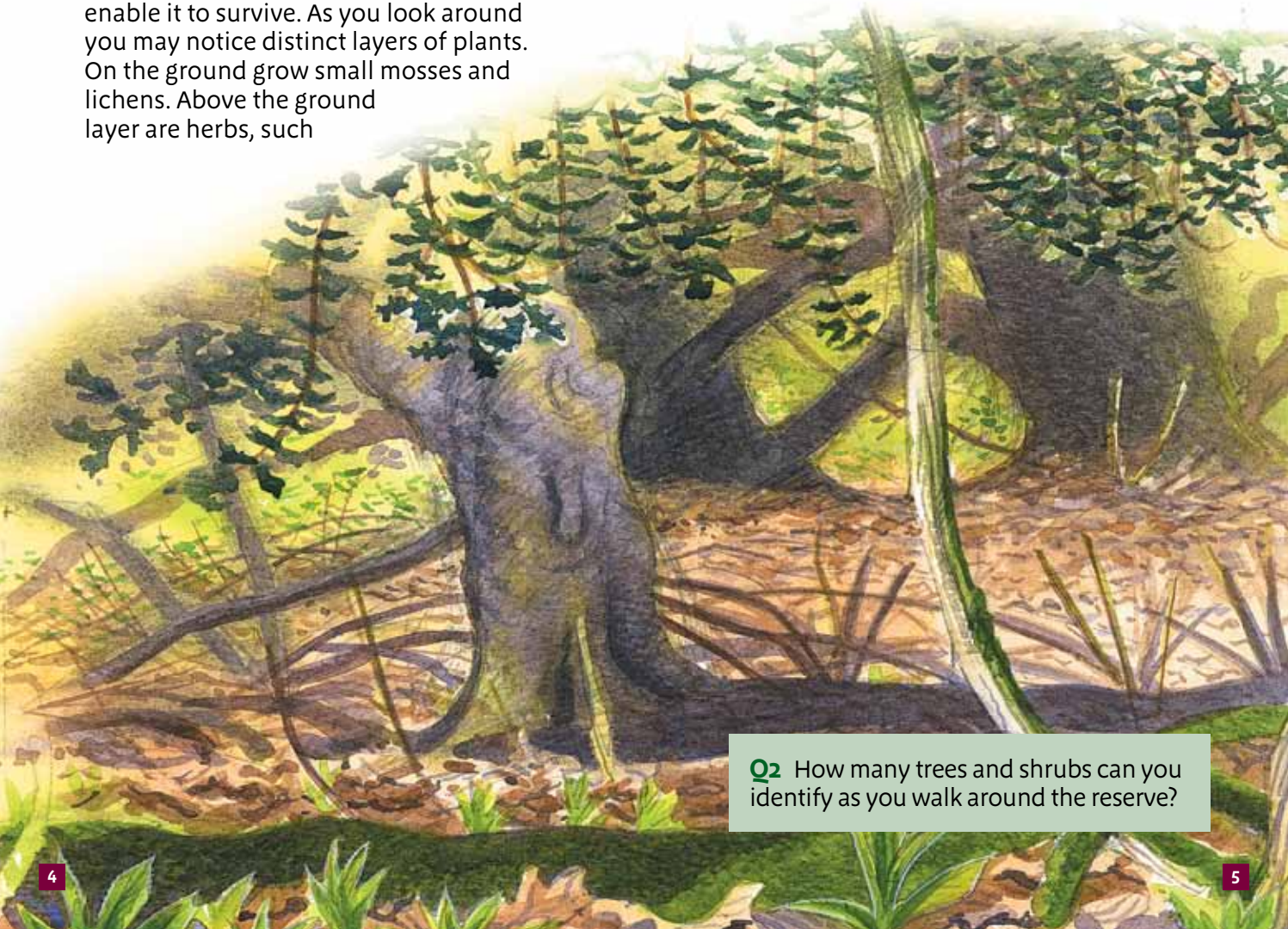
Q1 Soil pit 1: When do you think the chalk here was formed?

Post 2

Woodland

12,000 years ago, the last Ice Age ended and the climate gradually warmed, allowing new plants and animals to colonise this area. The deeper soils of the valley now hold a mixed deciduous woodland including trees like oak and ash, which shed their leaves in winter.

Each of the different plants in the wood has slightly different adaptations to enable it to survive. As you look around you may notice distinct layers of plants. On the ground grow small mosses and lichens. Above the ground layer are herbs, such as dog's mercury. Next comes a shrub layer with plants like holly, hawthorn and spindle which mostly grow in the gaps between the trees. Finally, high above the ground is the leaf canopy formed by trees such as ash and oak. The canopy develops in late spring and cuts out much of the light from the layers underneath. However, the plants that grow below the trees are adapted to the dim light and many produce their leaves and flowers early in the year before the canopy has developed.



Q2 How many trees and shrubs can you identify as you walk around the reserve?

Post 3

Woodland birds

As the woods grew, birds began to colonise them: more than fifty different species of bird may now breed within the vale. Each of them specialises, using the woodland in a particular way. Wrens feed close to the ground and in the depths of bushes. The blackbird listens for worms that move below the soil. Treecreepers climb carefully up the trunks of the trees, examining the bark for tasty mini-beasts. The agile blue tit searches under oak and yew leaves for caterpillars.

Listen carefully and you may hear the great spotted woodpecker hammering away at the bark to catch burrowing insects and larvae. Buzzards sometimes soar above the valley looking for small birds and mammals.

Great spotted woodpecker

Fieldfare

At night, the predatory tawny owl awakes and uses its sensitive ears, large eyes and silent wings to catch mice and shrews. Some birds come to the reserve for only part of the year, being adapted to a particular season. Fieldfares are winter visitors from the north, feeding on yew berries. Swallows and swifts are summer visitors from the south, and fly over the reserve catching insects.

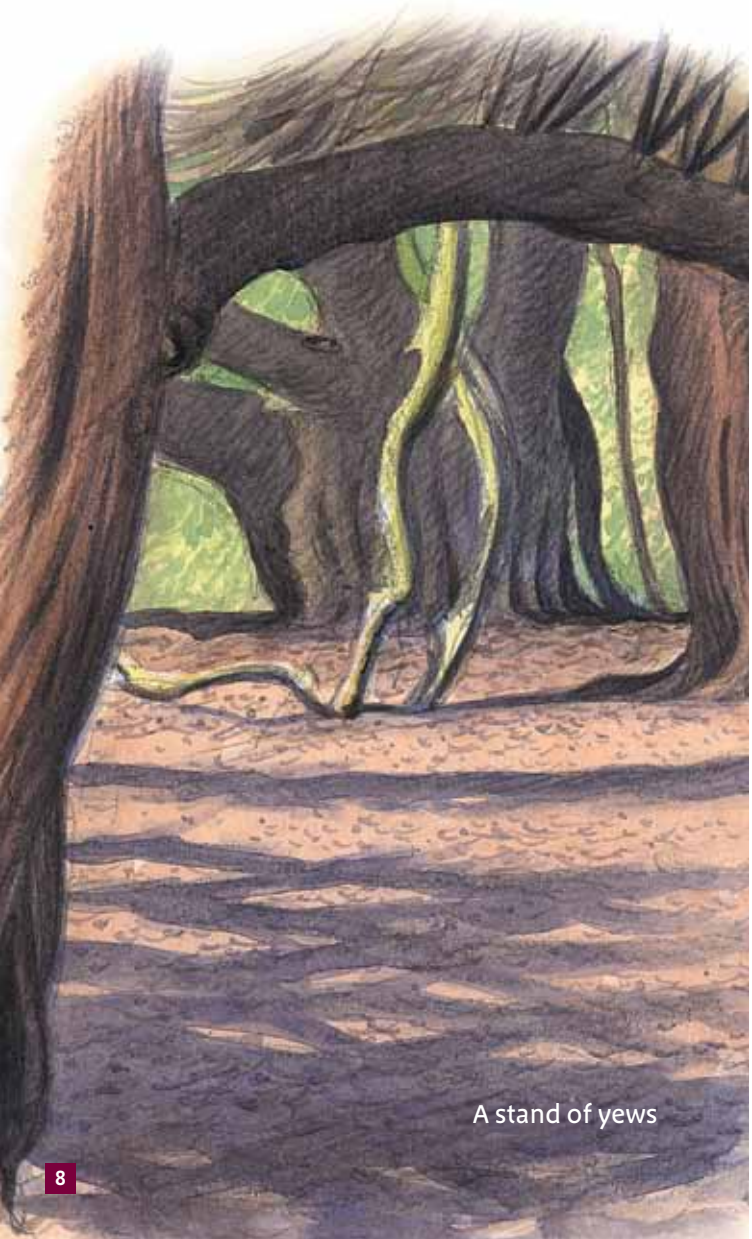
Blue Tit

Q3 Why do birds sing?

Post 4

Yew

Yews are evergreen trees and are well adapted to the dry chalky soil. The leaves are waxy, giving them a shiny appearance and are reduced in size and slightly curled.



A stand of yews

In early spring, some of the trees will produce small male cones, about the size of a grape seed. When shaken by the wind these will release great clouds of yellow pollen, which will drift through the air until it reaches the larger female cone.

After pollination a seed will gradually develop, surrounded by a red fleshy fruit. The seed of the yew is very poisonous but the 'fruits' (arils) are edible and many birds feed off them and distribute the seeds to new areas.

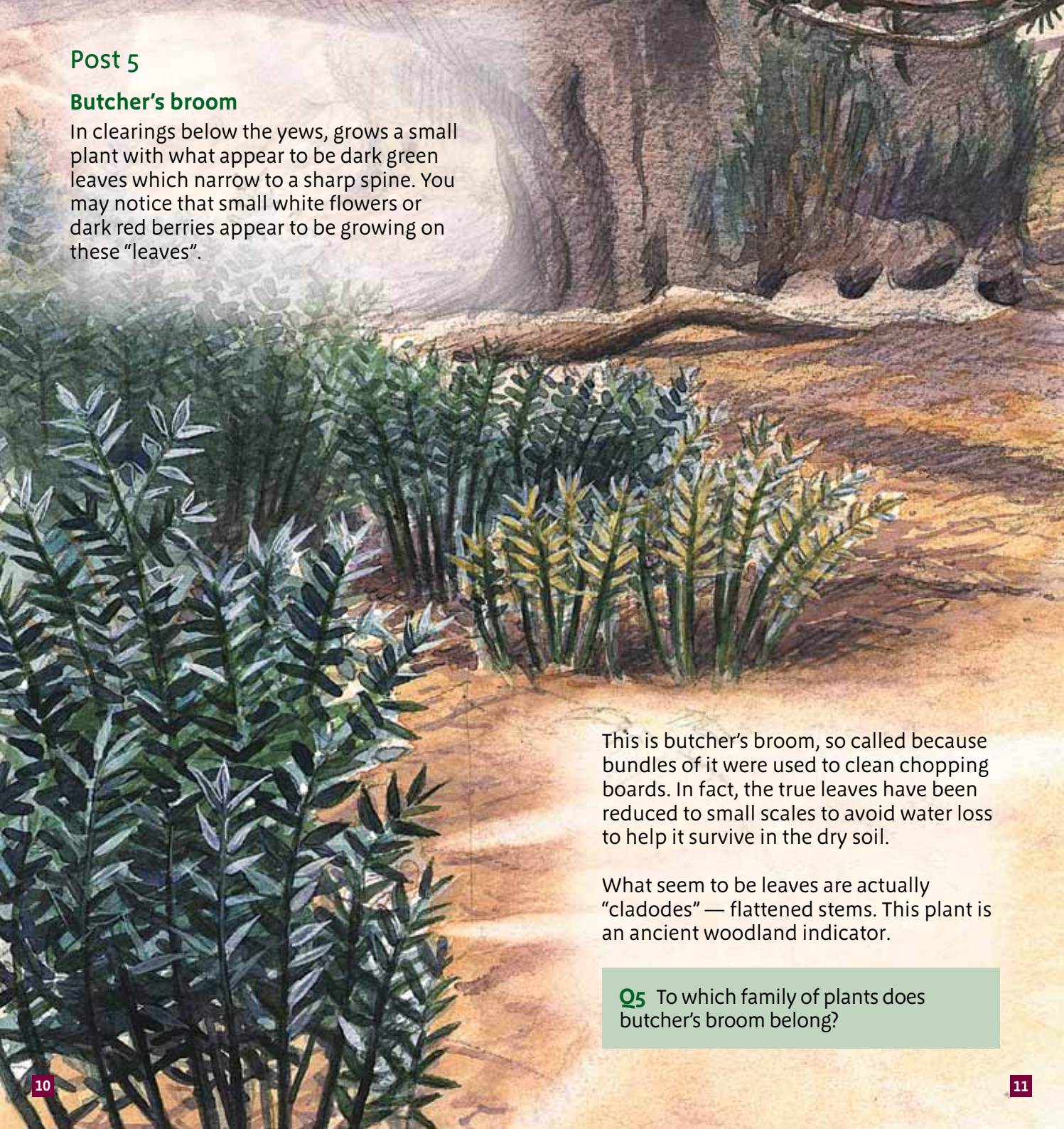
Yew berries

Q4 Why are the leaves of the yew tree small, curled, waxy and needle-like?

Post 5

Butcher's broom

In clearings below the yews, grows a small plant with what appear to be dark green leaves which narrow to a sharp spine. You may notice that small white flowers or dark red berries appear to be growing on these "leaves".



This is butcher's broom, so called because bundles of it were used to clean chopping boards. In fact, the true leaves have been reduced to small scales to avoid water loss to help it survive in the dry soil.

What seem to be leaves are actually "cladodes" — flattened stems. This plant is an ancient woodland indicator.

Q5 To which family of plants does butcher's broom belong?

Post 6

Oak

The oak is a slow-growing tree which may live for as long as five hundred years. It is one of the most important trees for wildlife in Britain. The leaves are produced in late April and early May and are an important food for many insects, which are in turn fed upon by a great variety of other animals.

Leaf miners hollow out tunnels in the leaves; bugs and aphids use their fine hollow mouthparts to suck the sap from the veins; some species of beetle burrow into the roots and others into the bark.

Acorn

Certain wasps and flies stimulate the tree to produce growths such as oak apple, marble and currant gall. Oak moths lay their eggs in the buds of the trees and these hatch out into caterpillars in the spring. The caterpillars then have only a few weeks of feeding as the leaves become tough and toxic. In late autumn, acorns feed many small mammals such as mice and squirrels.

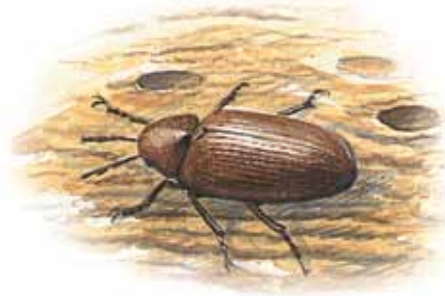
Oak apple

All of the herbivorous animals are prey to others. Ladybirds feast on aphids. Shrews consume beetles. Blue tits can search under the leaves for prey, and their breeding is timed to coincide with the abundance of caterpillars.

Caterpillar

Oak trees have had many uses. The wood formed the frames of Tudor houses and the furniture on which their occupants sat. In Nelson's time, shipwrights would have roamed the woods to find the 'knees', 'beams', 'bends' and 'bows' that formed the ships, the 'hearts of oak', of the British Navy.

Ladybird



Beetle

Q6 How many species of insects and mites (very small spider-like creatures) can be found on a mature oak tree?

Post 7

The scrub was cleared here to allow in more light. A rich flora has now developed including species such as eyebright, wild basil, rough hawkbit and wild parsnip.

In the height of summer, these flowers attract a variety of butterflies including marbled white, brimstone, small copper, gatekeeper, common blue and meadow brown. The coarse grass evident here is slender or wood false-brome *Brachypodium sylvaticum*. This will need to be kept in check if the less vigorous plants are to survive.

In winter, when the plants die down, the anthills become more obvious. These are a clear sign that this grassland has been undisturbed for many years.

Eyebright

Wood false-brome

Q7 What is the origin of the plant name, eyebright?

Post 8

Yew

Many of the mystical and superstitious beliefs surrounding the yew are very ancient. Druids used these trees and their poisonous seeds in religious ceremonies and the wood for making spears and bows. In Christian times, they became a symbol for resurrection and their branches were used as palms on Palm Sunday. Although many churchyards have yews growing in them, some of these trees certainly predate the birth of Christ, the churches having been built on much older, pagan sites. In medieval times, the hard wood was used in the making of axles, drinking vessels and mill cogs.

The yew groves form the heart of this reserve and here there are several large, very spectacular and extremely old trees. Legend says that they were originally planted to commemorate a battle won by the local men of Chichester against Viking marauders in AD 859. Yews are difficult trees to date but some in the reserve are certainly 500 years old and it is possible that they may be very much older than this, perhaps many times as old. Yews are still important medicinal plants; a substance called taxol, recently found in yew leaves, is now being used as a treatment for cancer.

Traveller's joy

To your right and trailing up and over many of the yew trees to reach the light, is a climbing plant with the scientific name of *Clematis vitalba*, a close relative of the many varieties of clematis so popular in

Traveller's joy

gardens. It has many country names such as old man's beard, daddy's whiskers, Father Christmas, snow in harvest, smokewood and woodbine. It was the famous sixteenth century herbalist, John Gerard, who called this beautiful plant traveller's joy. In the wet winter months, it produces great quantities of white feathery seeds which give it some of its common names. The dry winter stems were once cut for smoking, which could explain the origin of the old cigarette brand name 'Woodbine', although "woodbine" is merely a corruption of "woodbind", a description of how the plant grows on others.

Q8 What advantage does old man's beard gain by climbing upon other plants?

Post 9

Galls

Trees have many different types of defence against the insects that may attack them. To breach these defences, many insects specialise, attacking only one type of plant.

One insect that has successfully overcome the defences of the yew is a small gall midge called *Taxermyra taxi*. The female midge lays her eggs on the young yew leaves and these hatch in one to two weeks. The tiny creature which emerges will climb up the shoot and burrow into a bud. There, it will start to secrete chemicals which trick the tree into producing a growth called an artichoke gall. The gall is both home and larder for the hatchling. It will live within the gall for two years, with its home and food supply growing around it, before emerging through a small hole as an adult.

Artichoke galls

But the midge itself is prey for others! A parasitic chalcid wasp called *Mesopolobus diffinis* seeks out these galls and lays eggs on the midge. These hatch and consume it. Another chalcid wasp *Torymus nigritarsus* also attacks the midge but, if the other parasitic wasp *M. diffinis* is present, it will lay its eggs on the wasp, by

Midge *(Taxomyia taxi)*

preference. So we have a parasite living on another parasite, that lives on the midge, that lives off the yew! The yew is also attacked by the caterpillars of two species of moth, which also consume the gall, and the midge, if they find them, and they in turn are eaten by birds such as the blue tit.

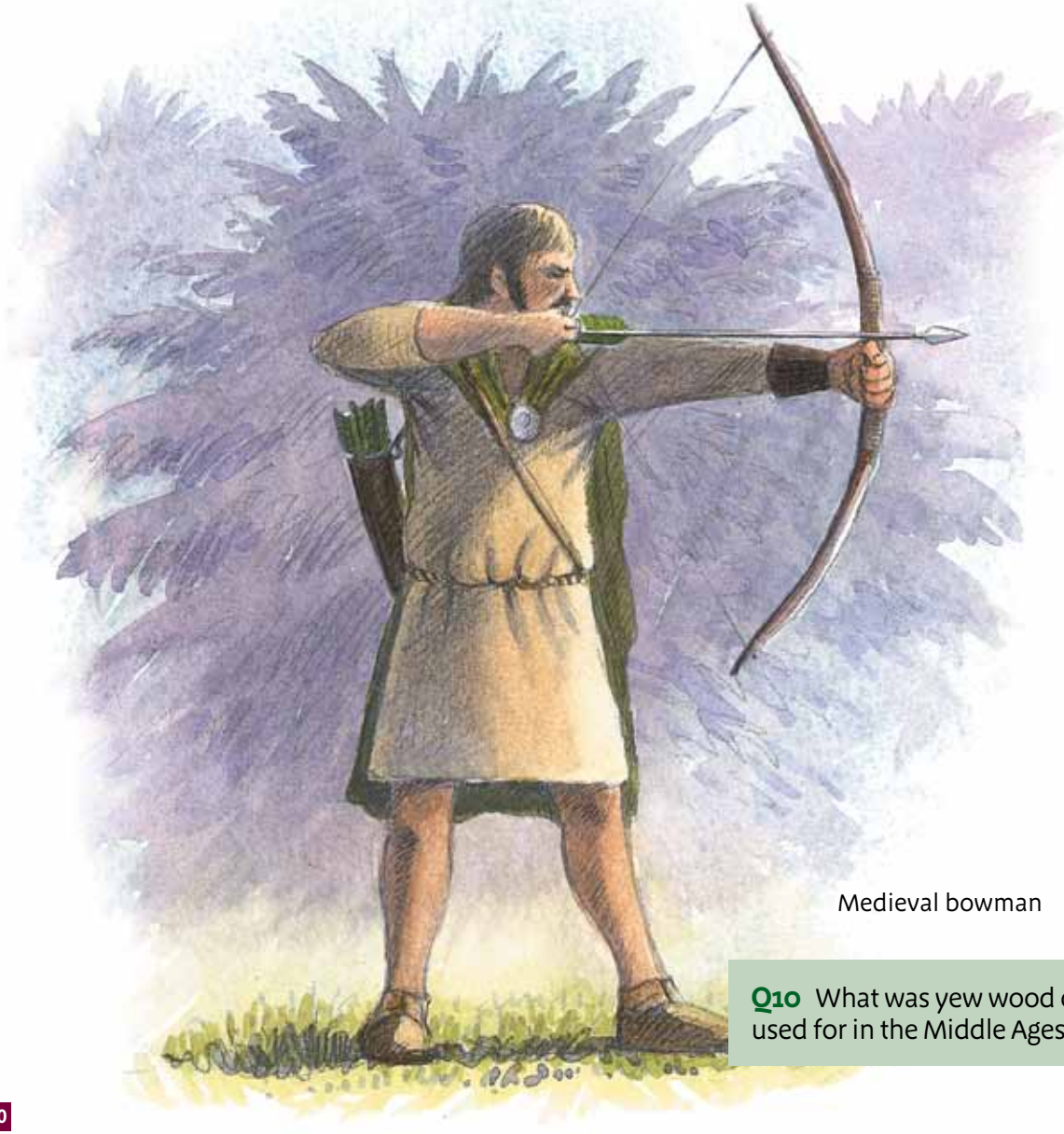
Parasitic chalcid wasp *(Torymus nigritarsus)*

Q9 What other examples of galls are commonly found at Kingley Vale?

Post 10

In some of the older yews on the reserve, the branches have grown so long they have touched the ground and rooted, producing a new ring of trees. This is how a natural yew grove is formed. Yews are slow growing and amongst the oldest living things in Britain. Some specimens in churchyards are thought to be anywhere between 2000 and 9000 years old.

You now emerge from the woodland into the vale itself. The trail turns right here and skirts the chalk grassland on your left.



Medieval bowman

Q10 What was yew wood commonly used for in the Middle Ages?

Post 11

Chalk grassland

Thousands of years ago, humans cleared the woodland that grew over much of this area and started to use the downs to graze their animals. The result was a 'living garment', 'soft as velvet, and herbage sweet as garden herbs'.*

Clustered bellflower

No single species dominates this ancient turf, the more vigorous ones having been held in check by the intense grazing. The reduced competition has allowed a great diversity of plants to grow — salad burnet, rockrose, dropwort, eyebright, wild thyme and many other species can be found here. Most of these plants are small and flattened to avoid being damaged by trampling and grazing; often, the leaves are small and hairy to reduce water loss in the dry soil. The great diversity of plants supports a huge number of invertebrates.

On a warm summer's day, even a brief examination might reveal many different types of butterfly, snail, harvestman, beetle, pillbug and ant.

Harebell

If grazing stopped, even for a short time, scrub would start to colonise the area and plants such as juniper, dogwood, bramble, briar and hawthorn would invade. Eventually, the grassland would revert to woodland. Before the Second World War, chalk grassland like this covered much of the North and South Downs. Now, only a few fragments of this ancient landscape remain.

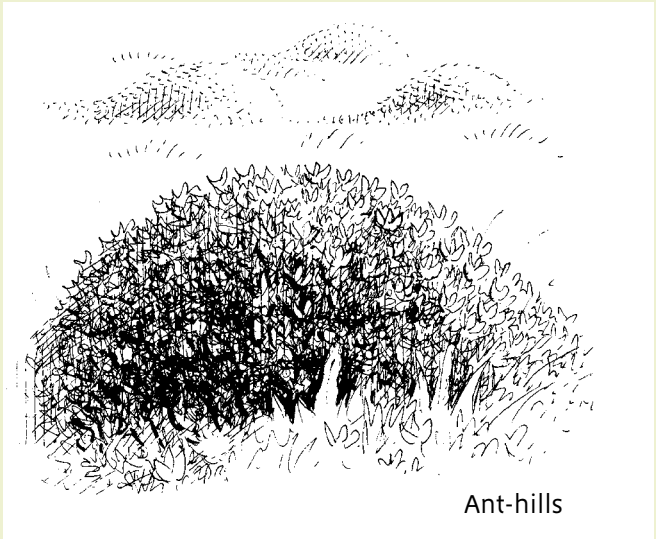
(Hudson 1900 and Daniel Defoe 1724)*

Q11 How many different types of plant can grow in a square metre of chalk grassland?

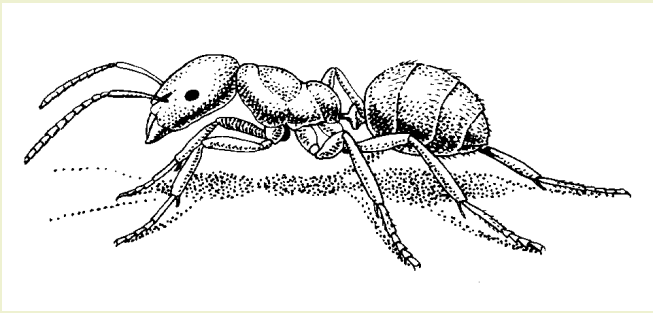
Ants

There are numerous small mounds on the chalk grassland. Burrowing rabbits make some of these, but most are produced by a much smaller animal, the yellow ant, and within them lies a hidden subterranean world.

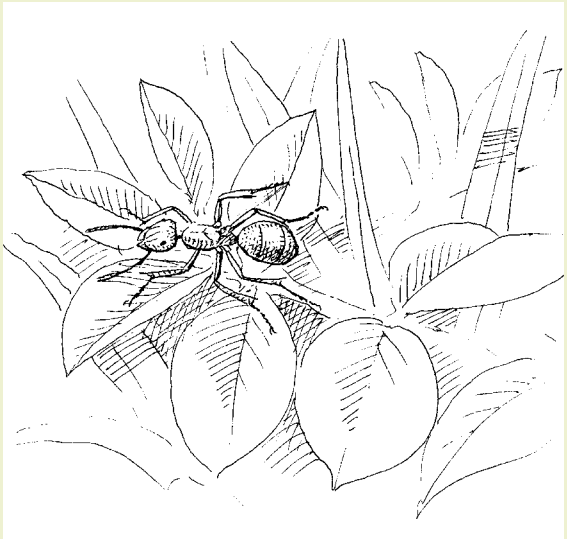
Ants are social insects and live in colonies of several thousand members. Most are sterile females called workers. These perform the majority of the tasks of the colony, like gathering food, building the nest and defending it against predators. Yellow ants live mostly below the surface and here, within their tunnels, they keep aphids, which they use like cattle. Aphids eat the roots of plants such as thyme and produce a sweet honeydew on which the ants then feed. The ant-hill is built up year by year by the workers and may reach half a metre in height. By trapping the sunlight, it keeps conditions warm and humid for those inside.



Ant-hills



The colony is largely controlled by a single fertile queen who, by releasing chemical scents, changes the behaviour of the other ants. In the summer months, the queen lays eggs which will develop into male and female winged ants. When conditions are right, these will all emerge at once and fly off to find a mate from another colony and form a new nest. Workers live only for a few weeks but a queen may survive for more than nine years and a colony even longer.



Post 12

Grasses

Some species of animal and plant are so widespread that we often overlook them, seeing only those which are rare and exotic. Grasses are the commonest type of plant on the reserve; at least 40 different species grow here. Unlike many plants, the leaves grow from the bottom up so that a deer or rabbit can remove the top of a grass without damaging it severely. As a result, grasses thrive wherever you find intense grazing and indeed they depend on it for their survival.

Sweet vernal grass

Grasses produce flowers but not brightly coloured petals, relying instead on the wind to distribute their pollen to other plants. The tall flowering stems of grasses such as Yorkshire fog, sweet vernal grass and red fescue may be common, but have their own elegant beauty which is easily missed.

Q12 What do you use grasses for every day?

Hares

Hares were once common in the reserve. Unlike rabbits, their close relatives, they do not make burrows. Hares are larger than rabbits and have a brownish rather than a grey coloration, with longer legs and longer black-tipped ears. They are mostly solitary, spending much of the day lying in shallow depressions in the grass, called forms.

As you walk through the reserve you may disturb a hare which will run off, jinking from side to side to avoid capture and following trails which it has made to allow for a quick getaway. Mating often occurs in spring when females may have to 'box' males that become too attentive. It is this type of behaviour that has produced the mad March hare of legend. A rich mythology surrounds the hare from several different cultures, many believing it has magical properties.

Post 13

You are now looking across the combe, with Chichester and Pagham Harbours just visible to the south on your left. As this bowl shape was scoured out by melting ice, the soil was washed off the slopes to the valley below. The results are clearly visible in soil pit 2, a few yards up the slope. Here, the chalk bedrock is very near the surface. The soil here is only 20 cm deep but it is this thin covering which produces the rich downland turf. Very few trees like shallow chalk soil but the yew is an exception and can produce an almost pure forest on the slopes. Note throughout the reserve how the roots of the yew trees grow close to the surface.

The path now proceeds up the hill.

View of main Coombe

Q13 How else was the local landscape most obviously affected by the scouring action of the melting ice?

Post 14

History and archaeology

Humans have long lived in this area. A fossil skull called 'Boxgrove Man' was found only 30 miles from here. This is thought to be 500,000 years old, making it one of the oldest human remains discovered in Europe.

This land was first used by roaming hunter-gatherers, both during and after the last Ice Age. Gradually, this way of life was replaced by more settled agricultural communities who farmed these valleys. The use of stone tools gave way to metals such as bronze. On the top of the downs, the Bronze Age burial mounds — tumuli — are a sign of the importance of this site 2500 years ago. Shards of Roman pottery have been found here — and there is evidence of an old Roman temple. In the medieval period, the area was given over to sheep grazing and ancient field boundaries are found in the valley below. In World War II, troops trained here for D-Day and you may still find the remains of old mortars on the reserve so take care. Humans have been inextricably linked with this land from the earliest times and we cannot understand this landscape without appreciating their influence.

Snails

Snails like the chalky downland soil because it provides plenty of calcium, with which they make their shells. However, snails have to be adapted to the dry conditions found here. When water is short, they close off the opening to their shells with waterproof mucus. Like other animals, snails specialise, different species being found in different parts of the reserve.

Brown-lipped snail

The brown-lipped snail prefers the wetter valley whereas the white-lipped snail favours the drier slopes.

Snails are eaten by song thrushes. The bird uses a flint, against which it breaks open the snail's shell. These "thrushes' anvils" are a common sight on the down. To avoid such predators, both species of snail have bands on their shells. This banding is extremely variable and it is thought that the different patterns provide camouflage in different areas.

Q14 How many species of snail and slug may be found on the reserve?

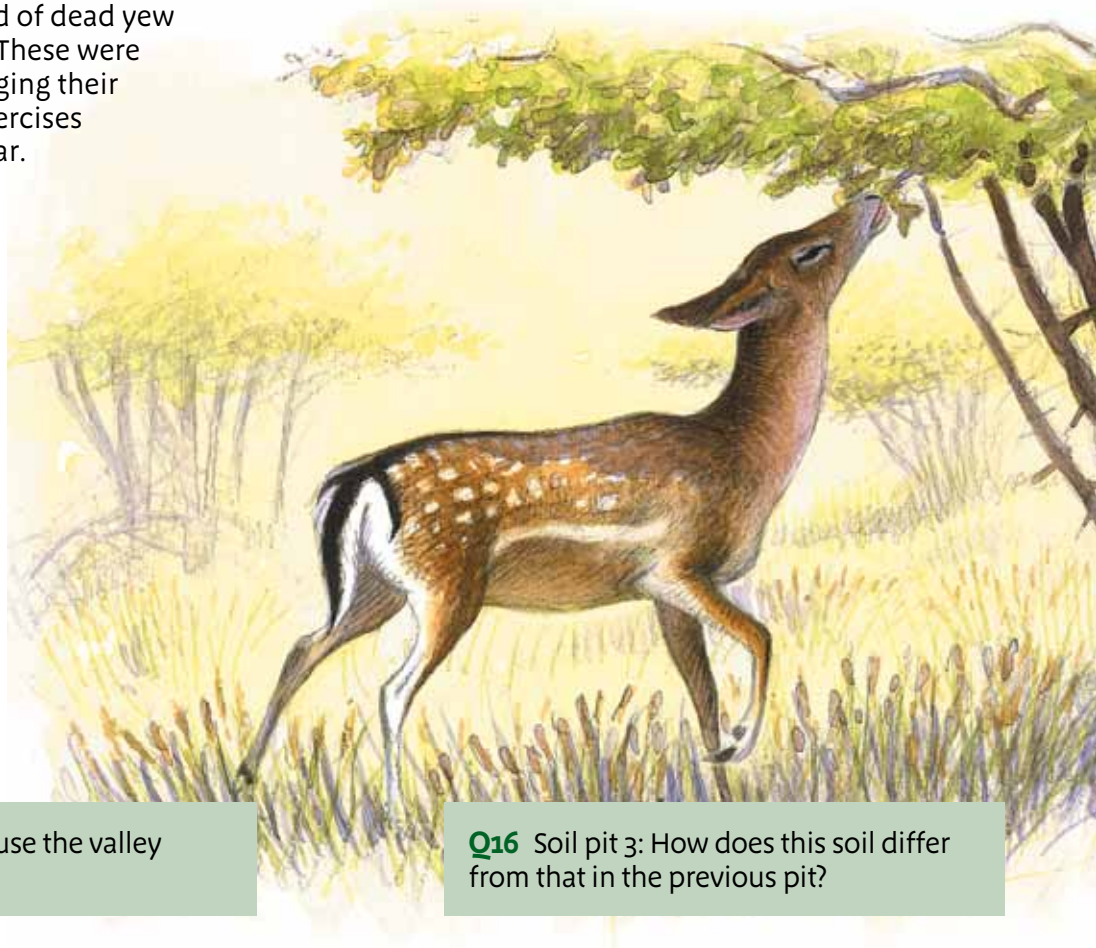
Post 15

The site of some supposed Stone Age flint mines is situated up the slope behind the post. People have been present in this valley from the earliest times. They mined flint nodules in the chalk to make axes and arrowheads, cultivated the valley ('lynchets' or field boundary banks are just visible below, on the valley floor) and buried their dead in the tumuli on the top of the hill. They also made various earthworks and fortifications to defend the hilltop in times of danger. More recent evidence of human presence can be seen in the stand of dead yew trees across the valley. These were killed by rifle fire damaging their bark during training exercises in the Second World War.

Post 16

If you look along the nature trail — in either direction — you may notice that the leaves on the scrub and small trees suddenly become more abundant above about 1.2 metres. This feature is especially clear when the shrubs are in flower. It's called the browse line and is created by deer, feeding on the vegetation. The position of the browse line can give an indication of the height of the deer in the area and how well-fed they are.

Here it shows that fallow deer rather than the smaller roe deer are responsible. The holly bushes along the trail defend themselves by producing many sharp spines on their lower leaves. Higher on the plant, above where the deer can reach, these spines become fewer and may be completely absent from the tops of the bush.



Q15 What do people use the valley for now?

Q16 Soil pit 3: How does this soil differ from that in the previous pit?

Post 17

The Tansley stone

Sir Arthur Tansley was a pioneer in the study of the environment and one of the founders of the body now known as Natural England, the organisation that protects wildlife habitats such as this one. The view from the top of the downs was one of his favourites and, from this spot, one can see for many miles across the farmland and woodland surrounding the reserve.

Since 1945, there have been dramatic alterations to the landscape, largely brought about by changes in farming. Fields have been enlarged to allow for the use of modern machinery. As a result, some 360,000 km of hedgerow have been lost. Insecticides and herbicides have greatly improved yields, but destroyed wildlife habitat. Fertilisers have made crops more productive, but 95% of lowland grasslands and meadows have been lost.

However, farmers and landowners are now in the position to help link up these fragmented special places by incentives such as Environmental Stewardship. There are options to create wildlife habitats and corridors to help species such as butterflies move from one area to another. Farmland birds are also benefitting from the farmers efforts under such schemes.

Q17 What are the benefits landowners can achieve by helping link habitats across farmland?

Post 18

Chalk Heath

On the tops of the downs, the chalk is covered with clay containing flint. This produces a quite different soil to that found on the slopes or in the valley. The clay makes the soil quite acid. However, the underlying chalk is alkaline. This combination produces a very unusual type of vegetation called chalk heath: a mixture of acid-loving plants like heather and gorse and those like thyme and salad burnet which are found on chalk. Habitats like this are rare and there are only a few hundred hectares left in Britain.

Chalkhill blue

Common blue larva

Common blue

Common and chalkhill blue butterflies

The gleaming blue males of these two attractive species are evocative symbols of the chalk downs. The females, which are more brownish, lay their eggs, respectively, on the buds and leaves of bird's-foot trefoil and horseshoe vetch plants growing on sunny slopes. Chalkhill blues have only one generation each year, flying mainly in July and August. Common blues fly in two generations a year, the first in May and June, and the second in August and September. The two species also have a different over-wintering strategy. The eggs of the chalkhill blue, laid in late summer, do not hatch until the following spring, whereas it is the half grown larva of the common blue that hibernates through the winter, sheltering low down in the leaf litter. Ants attend the growing caterpillars of both species in order to obtain sweet secretions produced by special glands, and in return are thought to provide a measure of protection from predatory insects and spiders.

Q18 In the 1950s, myxomatosis killed most of the rabbits in southern Britain. What effect did this have on the chalk grassland?

Post 19

There are six Bronze Age burial barrows on the mound here although two are not very obvious. The two most clearly visible are bell barrows, a style peculiar to Wessex man. Only about 250 of this type survive in Britain. Between these barrows, and to the north east of one of them, are depressions known as pond barrows. These are also rare, only about 60 being known. Still further to the north east are two bowl barrows.

One legend has it that in ancient times Danish kings were killed in a battle here and buried beneath these tumuli. Another suggests that those who died were kings from Wessex. Although this may well be why the site became known as Kingley Vale, the barrows may already have been here for 1500 years at the time of these conflicts!

Looking south towards the sea, the entrance to Chichester Harbour is on your right. Bosham channel is the water stretching towards you with a sharp elbow to the left. To the left of the point of the elbow is Bosham harbour. King Canute's daughter was buried nearby in Bosham church. Further inland you can see the spire of Chichester cathedral.

Please remember that these are scheduled monuments of great interest and enormous archaeological value.

It is an offence to damage them in any way, eg by lighting fires. They have survived here for at least 3000 years.

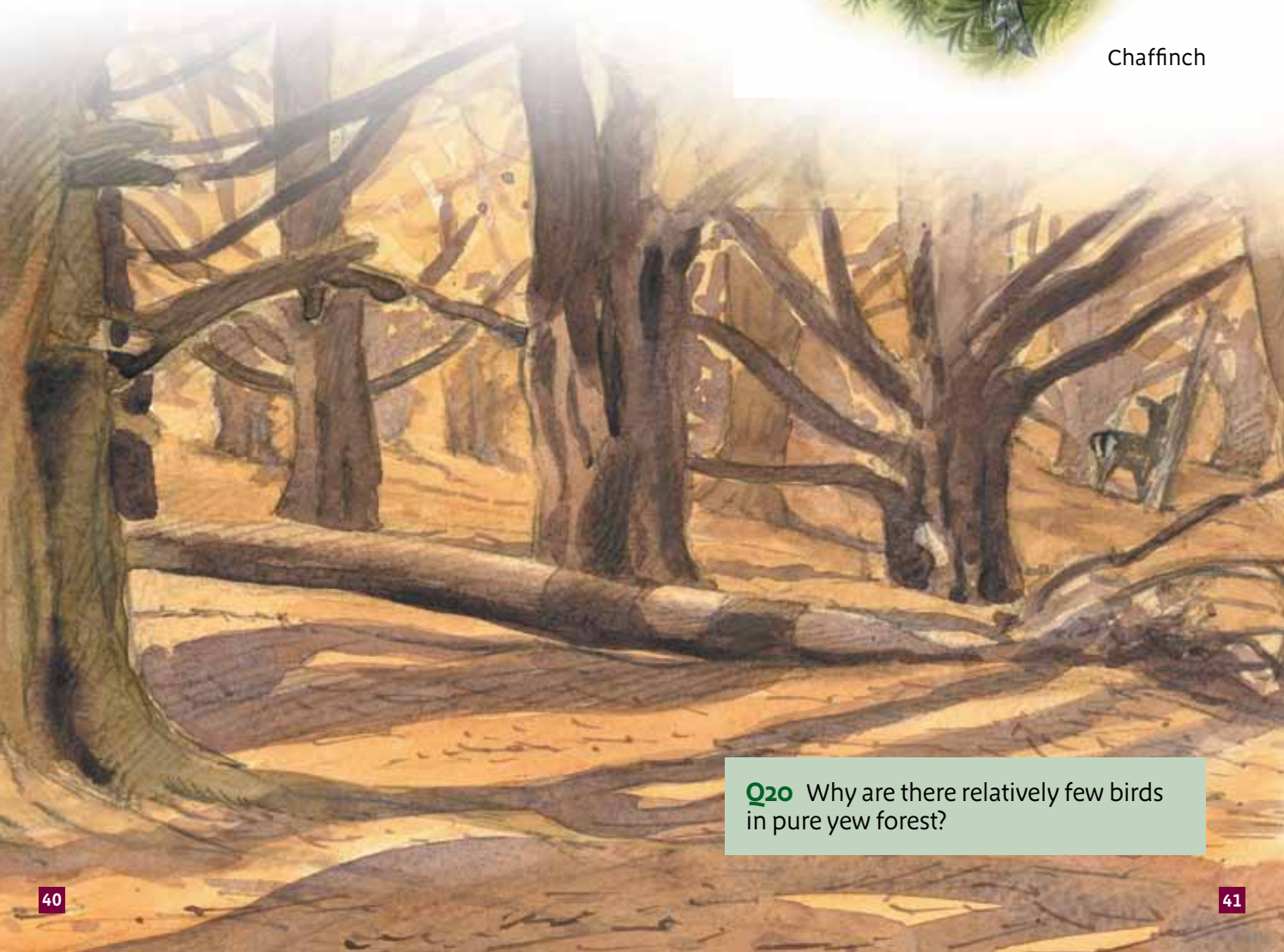
Please don't let this generation be the one that destroys them!

Q19 Which Government body has responsibility for looking after ancient monuments?

Post 20

Here the dense canopy of yew trees prevents other plants from growing. Pure yew wood also limits the number of birds, hence the name "birdless grove" given to these and other yew woods. In fact, a few species do inhabit this part regularly and you may hear singing robin, blackbird, chaffinch, great tit and coat tit and, occasionally, marsh tit in spring and summer.

Chaffinch



Q20 Why are there relatively few birds in pure yew forest?

Post 21

Speckled wood butterfly

This butterfly is common here. Males perch near patches of sunlight or patrol the woodland canopy to wait for females. If another male approaches his territory, the male will leave his perch to challenge the intruder. The rivals fly up into the air bumping into each other in a spiral battle. The fight is soon over and usually results in the intruder retreating.

In the afternoon, the females are attracted to these patches of sunlight on the woodland floor. When a female appears, the male courts her by dancing in the dappled shade. If she is impressed with his display, the pair will fly up into the canopy to mate.

Speckled wood battling

Q21 Why does the speckled wood butterfly have pale yellow spots on its wings?

Post 22

Orchids

The wind blowing over the downs carries with it the tiny dust-like seeds of orchids. These seeds are amongst the smallest of any flowering plant and are released in huge numbers. Caught by the wind, they may drift for many miles before settling. On landing, they use fungi, within the soil, to help them to germinate. The fungi supply the orchids with many of the nutrients needed for their growth. Some orchids may spend much of their lives completely below the surface of the ground before appearing and flowering. The bee orchid spends five to six years here, before flowering and dying in a few brief months. As a result of this behaviour, many orchids appear and disappear from sites in a mysterious way.

Orchids also have very sophisticated means of ensuring that their pollen gets from one flower to another. The pollen is produced in two sacs called pollinia which are attached by two stalks to a C-shaped sticky clasper. When a butterfly lands on the orchid, it sticks its coiled, straw-like proboscis into the flower to find and drink the sugary nectar. As it does so, it brushes against the clasper which then becomes stuck to the proboscis. When the butterfly flies off, the stalks dry and the pollinia swing forward, so that when the proboscis is pushed into the next flower the pollen sacs will touch the female part. Some butterflies have been seen with seven or more pollinia attached to them. To make matters worse for the butterfly, many orchids have false nectaries which don't provide any reward! Seven different types of orchid are found on the reserve including the bee orchid.

Bee orchid

Q22 Where does the name orchid come from?

Post 23

Deer

Both roe and fallow deer are common on the reserve but are wary of people. They have poor eyesight but excellent hearing. They also have a very acute sense of smell, and can detect the slightest movement. If you walk very quietly down the hill you may be lucky enough to see some. The prevailing wind is from the south west and your scent will be blown away from the deer. The male deer hold territories to which the female does are attracted. In July and August the rut begins, in which males defend their territories against other males. Roe bucks make a barking

Fallow deer

Roe deer

noise whereas the noise made by male fallow bucks is more like a groan. Both species scent mark trees, stamp their forefeet and chase each other about. If this is not successful, the males may fight, locking antlers and pushing and twisting. Occasionally these fights may result in the death of one of the rivals. The does will only mate with those males who can successfully hold a territory. The fawns will not be born until the following May or June. Deer may stop the regeneration of trees such as yew, which may depend on the protection of nearby shrubs to allow them to become established.

Q23 How might shrubs such as hawthorn and juniper help the regeneration of the yew?

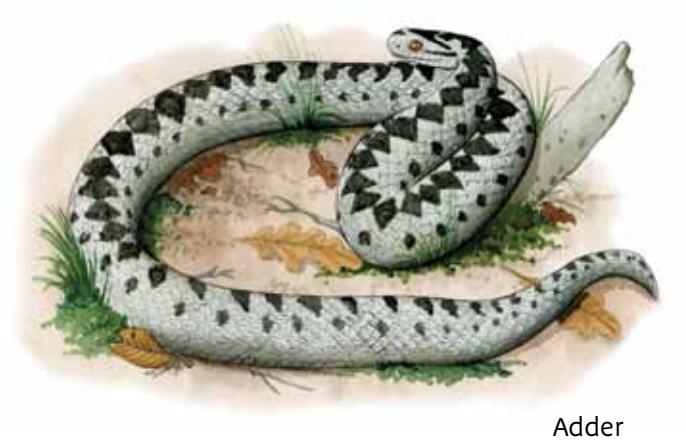
Post 24

Reptiles

On warm summer days, you may be fortunate enough to find a common lizard basking on these paths. This species hibernates from October to February, emerging in spring when it starts to eat spiders and insects. Mating occurs in April and May. Unlike most of its relatives, the common lizard does not lay eggs, but produces small and fully developed young.

Common lizard

The slowworm is actually a lizard without legs and slithers along the ground like a snake. Slowworms are mostly nocturnal, emerging to eat slugs and snails which they relish. Some slowworms have been known to live as long as 33 years.



Adder

The adder is a major predator of the common lizard and gives birth to live young. It also hibernates before emerging in spring. The adder is the only poisonous snake in the British Isles. It uses its hollow fangs to inject venom to kill its prey. Adders very rarely bite humans and when they do, the result, though painful, is **almost never** lethal: many more people die from bee stings than adder bites. Adders are extremely sensitive to small vibrations in the ground, and the disturbance caused by the act of walking, normally makes them retreat rapidly.

The grassland here supports a variety of species including harebells, frog orchid, common centaury and the spectacular ploughman's spikenard. Wild marjoram attracts hosts of insects.

Ploughman's spikenard was a native substitute for a perfume made from the roots of a Himalayan plant. Roots were dried and hung in cottages as air fresheners. Ploughmen would have had more need than most for such things!

Q24 Which is Britain's largest snake?

Post 25

The reserve

This guide can only give an impression of some of the many plants and animals that are found here. Most of the living things that live in this reserve are unnamed and their lives are obscure. Most have never been studied. Even a teaspoon of soil may contain 5000 different species of bacteria, 20 miles of tiny fungal threads and hundreds of different types of worm and insect. Almost all of these are small, unstudied and unnamed!

Many of the living things within this reserve are now rare beyond its borders and it is important that such places are conserved.

Overview of reserve

Answers

1 In the Cretaceous period, about 136 million years ago.

2 Altogether, there are some 33 different species of tree and shrub on the reserve. Ash, oak, hawthorn, spindle, dogwood, blackthorn, privet, buckthorn and of course yew are among the most common.

3 Male birds sing first to establish territories and to defend them from other males of the same species. They also sing to attract mates. Female robins sing in the winter and this behaviour, too, seems to be connected with territorial defence.

4 Yew tree leaves are shaped this way to reduce the loss of water through transpiration.

5 Lily family.

6 More than 420 different species of insect and mite and many more other invertebrates.

7 Eyebright was used to help relieve eyestrain and inflammations of the eye. The whole plant was infused or the fresh stems crushed to produce an ointment.

8 By relying on other species for support, the plant does not have to spend energy on producing a thick stem.

9 Two common ones are oak apple and the spectacular "robin's pincushion" found on wild roses.

10 Making longbows – although some of the wood may have been imported.

11 As many as 40 species, including 10 or so grasses, can be found in rich chalk grassland.

12 Eating! Many staple foods come from cultivated grasses, the most obvious being bread (wheat or rye) porridge (from oats) and rice.

13 Chichester and Pagham Harbours were formed.

14 28 species have been recorded — there may be more yet to be discovered here.

15 Recreation, research and nature conservation.

16 The chalk has a capping of clay and flints.

17 It allows freer movement of birds, mammals, and insects across the landscape.

18 The removal of grazing pressure led to a huge increase in scrub.

19 English Heritage.

20 Fewer than 10 species of insects live on yew trees, unlike oaks and many other deciduous trees which support vastly more species. Yews also cast dense shade all year round, thus suppressing the growth of flowers, which in turn limits insect numbers.

21 When resting on a leaf in dappled sunlight, the butterfly merges perfectly with its background. This camouflage decreases the risk of its being eaten by predators.

22 The Greek word orchis means testicle, the appearance of which the root tubers were thought to resemble!

23 These shrubs "nurse" young yews by protecting them from being eaten by deer.

24 Grass snake. Adders rarely exceed 60cm in length whereas grass snakes can reach 150 cm. The rare smooth snake is about the same length as the adder.

Field Notes

Field Notes

Location of Kingley Vale NNR

Kingley Vale National Nature Reserve lies near the village of West Stoke. From a car park north of the village there's a track leading to the main entrance of the Reserve.

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