

## *Growing and caring for trees*

We British are great tree planters. Our woefully denuded countryside was down to 5% tree cover 100 years ago, now it is more than double that thanks to planting. Our success and experience makes us a world leader in sympathetic planting – virtually all our state forests are certified<sup>1</sup> – though many wouldn't have said that 50 years ago when we were coniferising ancient woodlands and plastering hills with square blocks of dark green spruce! Our history of planting goes back many centuries: we have all surely heard how in the 17th and 18th Centuries the cry was to plant oaks because the navy was running short of shipbuilding timber.

This is a long chapter and I've divided it into four sections to look at:

- how to plant trees and create a wood;
- how to encourage trees to develop from natural seeding – what foresters call natural regeneration;
- what may need doing as a stand of trees develops – cleaning, pruning, thinning, felling; and
- coppicing and pollarding.

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<sup>1</sup> Certifying of forests first began about 10 years ago and is an independent vetting that management meets agreed standards of good practice to ensure sustainability.



## PLANTING A WOOD

### Planting trees – the basics

In the Bible the Teacher proclaims: “There is a time for everything, and a season for every activity ... a time to plant, a time to uproot ... ” (Eccl. 3.1–2). So what are the questions we need to cover to know that it is a ‘good time to plant’?

#### *Where to plant trees*

An odd question to begin with, but are there spots or places to avoid? I ask this first because visitors to my wood who see gaps, from a recent thinning or creation of a glade, often assume that tree planting is now needed: it isn't. Generally we are overly keen to fill up ground. Remember that existing trees need space to grow and wildlife thrives in gaps and glades. More specifically do not plant trees that might damage valuable habitat such as wetland or right next to streams and, similarly, not right beside rides and roads. If you do plant up a large opening, only plant trees in the middle where there is clear sky overhead; young trees don't grow well in the shade of old ones.

So, plant trees to turn a field into a wood or as a way of regenerating a large patch that has been clear felled, otherwise think hard about whether you really need to.

As an aside, if you need to add trees to a hedgerow, try recruiting a sapling by not cutting it when hedge-trimming. Make sure the sapling is growing directly above where it is rooting to avoid developing a ‘S’ bend and remember to mark the sapling with a stick or ribbon so whoever is trimming the hedge can see it easily.

#### *What species to plant*

In Britain we have three native conifers and about 30 native broadleaves. Introductions from across the world in the last 300 years have added immeasurably to the possibilities. In the appendix there is a list of the commoner species, what they are good for and the conditions that best suit them. If in doubt consult a local forester, though usually Forestry Commission staff will be



happy to make suggestions, and do see what is growing well already in or near your wood. You will rarely go badly wrong by continuing to grow what is doing well in the vicinity.

*Where can small trees be bought?*

Contact a tree or forest nursery, not a garden centre. There are many nurseries and your nearest will not be too far away. In the Yellow Pages they are entered under 'Nursery Horticultural – wholesale' and/or 'retail'. When choosing a nursery make sure the advertisement mentions trees, then phone them and go over to see what is on offer, or visit the website or request a catalogue and ask for a quotation for what you seek. Most nurseries like orders well in advance and then they lift the plants you want – 'plants' are what the trade calls small trees suitable for planting – and dispatch them to you just before the date they are to be planted. Sometimes plants will be lifted in November or December, carefully packed in bundles in purpose-made double skinned polythene bags, and then kept in a cold store for dispatch in late winter or early spring. The best thing is to contact your local nursery as early as possible in the autumn to discuss your requirements.

If you like the idea of developing your own small tree nursery there is plenty of advice in books. We will look at the subject briefly a little later.

*What size of plants are best?*

Usually it is the smaller the better. A plant 20–30 cm tall and 5–7 mm thick at the root collar i.e. at the point where stem and roots meet, will readily become established and start growing well once the weather warms up, provided of course it is protected from browsing damage and vigorous weeds.

Bigger trees, such as whips, saplings, half-standards (~3 m tall) and standards (>3 m tall), all impose increasing strain on the newly inserted root system. Their crowns of leaves demand many litres of water each day which the roots cannot easily deliver because many were broken off, especially the fine roots, when the trees were lifted from the nursery and because they haven't had much chance to re-grow in the new soil. Not surprisingly, large trees planted for effect on housing estates can



languish for years with thin crowns and poor leaves. Worse, large trees are one hundred times more expensive, and I'm not exaggerating.

*What kind of tree to plant?*

Seedlings and transplants are the two commonest names you will come across in a nursery catalogue. When they are sold no soil attaches to the roots, so they are called 'bare-rooted' plants. We will define them along with some other types of plants.

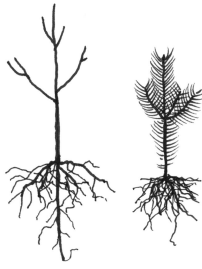
*Seedling* This is a plant that has grown up from seed, but has never been moved in the nursery until it is lifted for dispatch after it has been sold. Seedlings are usually one or two years old and 15–50 cm tall.

*Transplant* This plant began life as a seedling but was moved, when dormant, from one nursery bed to another, hence the name 'transplant'. The moving between beds severs tap roots and helps ensure a stocky, more robust, plant with a compact root ball. They are the commonest type of plant used and are mostly 2–4 years old and 15–75 cm tall.

*Undercut* This plant is a seedling that has had its roots undercut *in situ* at a depth of 10 or 15 cm to achieve the same effect as transplanting but without moving it from one bed to another. They are usually 1–3 years old and 15–75 cm tall.

*Whips* Plants that are allowed to grow beyond the seedling/transplant stage for another one or two years in the nursery to reach 80–150 cm tall. If well furnished with branches, they are known as 'feathered whips'.

*Badgers, Beeches and Blisters*



(i)



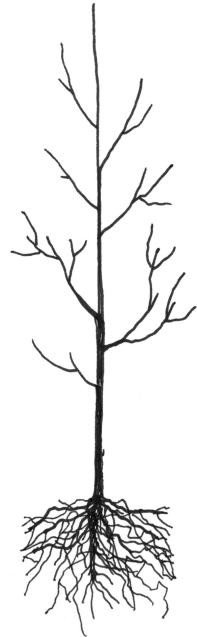
(ii)



(iii)



(v)



(iv)

*Some of the types of plants/trees for sale at a forest nursery (not to scale)*

*(i) transplants*

*(ii) container grown tree*

*(iii) cutting (typically of poplar), and after it has become rooted*

*(iv) feathered whip*

*(v) half standard*

In a nursery catalogue the type of plant and its age is indicated by a simple code. A seedling is just given an age. A transplant may



be shown as 1+1 meaning it is two years old, having grown one year as a seedling and then been transplanted to another bed for a further year. If it grew for two years in a transplant bed the catalogue shows this 3-year-old plant as 1+2. An undercut is a 1u1 if it grows as a seedling for one year, was then undercut, usually in about June of the second year, before being sold. Sometimes undercutting is done during the first season in July and one year old plants and are shown as  $\frac{1}{2}u\frac{1}{2}$ , but are seldom sold.

*Container-grown stock* Growing small trees in containers is quite common. It gives each plant a root ball and is used for trees, such as birch and Corsican pine, which lack fibrous roots to improve establishment. In general, forest trees are bought as bare-rooted stock. There are many kinds of containers and many names for them: containerised stock, Japanese paper pots, cell-grown stock, plant plugs raised in pre-formed plastic trays, pot grown stock, and ones raised in a hinged 'book' such as 'Roottrainers'. Container grown trees are more expensive, typically twice the cost per plant of bare-rooted ones. Many nurseries do not stock all tree species in this form.

### *Plant quality*

So far we have considered what type, what size and from where plants can be obtained, but what about quality? It is important for plants to be sturdy to survive the rigours of planting whatever the site. Although height of plants is commonly given in catalogues, root collar diameter i.e. how thick it is at the point where stem and roots meet, is more important. Research shows unequivocally that thickness of stem, not how tall a plant is, is the most reliable indicator for subsequent survival after planting. Basically one wants healthy plants that have thick root collars, not weak flimsy ones. Equally important is a vigorous, fibrous root system, not a single long tap root.

The plants themselves must be free of damage, disease and other defects.

### *When plants arrive*

Forest plants (young trees) are dispatched in special, double skinned, polythene bags which are black on the inside, sealed and



designed to minimise heating if ever exposed to the sun, even if briefly. On receipt of your plants, open the bag and check that the right species have been sent and that the specifications are as ordered. Then take one or two plants from a few of the bundles – transplants are typically in bundles of 25 or 50 – and check their health by nicking the bark on the stem with your thumbnail. The tissue beneath should be green or greenish-white. If it is at all brownish then the plant is likely to be dead even if the buds and other parts look OK. If more than one or two are brownish, reject the entire consignment and complain to the nurseryman.

Once you are happy with the plants – they are what you ordered and appear healthy – gently retie the bundle and close the bag. Store the bag(s) in a cool, dry place, preferably in the dark or in heavy shade, and make sure it is frost-free. An unheated garage is ideal provided it never cools to below freezing. While dormant in winter and early spring, such plants will remain alive for many weeks. Normally plants will stay damp enough in the bag they came in if it is kept sealed until time for planting.

Try not to move the plants until the day of planting. In particular DO NOT manhandle the bags, NEVER throw them around or drop them: treat them like your finest dinner service! The fine roots of young trees are easily broken and damaged, but this is rarely obvious to see. Experiments by the Forestry Commission show that bags with bundles of plants that are dropped, even from a height of only one metre, reduced the survival of the young plants when planted out. The more frequent the dropping and mishandling the worse survival and growth became. The take home message is: handle with care.

Obtaining trees for planting need not be an expensive business. A little forethought and care of the plants received is all that is required.

#### *When is the best time to plant?*

Plant trees anytime from mid-autumn to mid-spring, but avoid very cold and frosty weather. In the south of Britain all planting should be done by the end of March, in the north by mid-April. Trees must be planted while they are dormant and before they start coming into leaf (flushing).



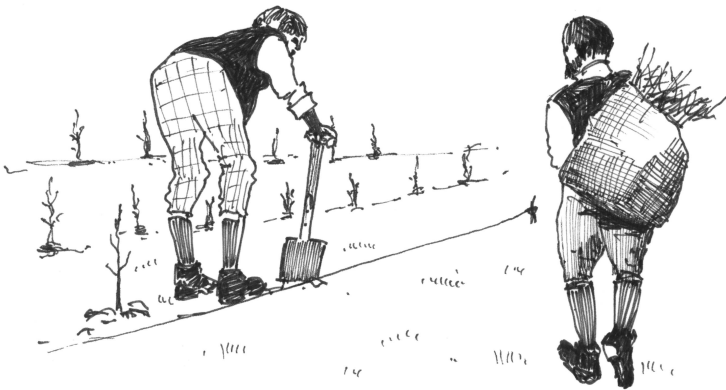
*How far apart should trees be planted?*

Usually trees are planted 2–3 m apart and equidistant along and between rows i.e. square spacing. You mark the position with a stick, or if planting only a few trees judge the distance approximately by pacing. There's no need to lay out a new wood or a belt of trees with the 'theodolite' precision seen in many an orchard.

If you are planting a thick hedge, three rows are a good idea and use triangular spacing. Set the trees about one metre apart.

*How is planting actually done?*

While a nicely dug pit is best, a simple slit in the ground with a spade or mattock is often sufficient. Gently place the roots in the slit or pit and tease them out. Then, while holding the tiny tree vertical, replace soil and firm it home with the ball of the foot. Make sure that the tree is planted only to the depth of the root collar, neither deeper nor shallower.



*John White's idea of my brother-in-law and me planting trees in my wood – plus fours are not de rigueur*

It is sometimes recommended that broken or damaged roots are trimmed with secateurs before planting. This takes time, is probably of little benefit and the further handling of the tender root system will break off more fine roots. The only time trimming will help is where roots are long and straggly since it's no good simply stuffing everything into the ground.





*Do I need to stake my trees?*

No is the short answer, unless the trees are over 2 m tall – which is not recommended. If staking has to be done, use a short one and secure the tree at about 30 cm from the ground. Do not fasten a tree to a stake at 1.2–1.5 m; the tree needs to flex from the base to build its stem properly. All a stake does is to help anchor the root system. Do remember to loosen the tie each year. By the third year a stake should no longer be needed.

*Do trees need fertilising and irrigating?*

In general, ‘no’ to both questions. If tree planting is done properly neither fertiliser nor irrigation will be needed. Phosphate (P) may help on some poor upland sites or sandy soils, but elsewhere the soil is already fertile enough for the undemanding appetites of trees. If you’ve planted the trees properly in the autumn or early spring and provided competing weeds are under control, you shouldn’t need to water them in the summer however hot and dry it gets. Only large trees such as half-standards may need irrigating just to keep them alive, but you know what I think about such planting stock already!

*A summary*

The key points are:

- generally use small, thick-stemmed plants bought from a reputable forest nursery;
- make sure plants are alive and healthy – a thumbnail nick of the bark should reveal greenish tissue;
- always keep plants cool, shaded and prevent roots from drying out – treat them gently;
- plant trees while still dormant and before starting to flush i.e. by the end of March;
- plant during cool, damp weather and not when it is frosty or very dry;
- plant the tree by inserting roots carefully into a small pit or slit in the ground and gently firm the soil with the ball of the foot.



## What happens next?

So, after the planting, what then happens? Put another way, how are newly planted trees looked after during their first few months and years? There are really only two main concerns: protect them from damage, and don't let weeds get the upper hand.

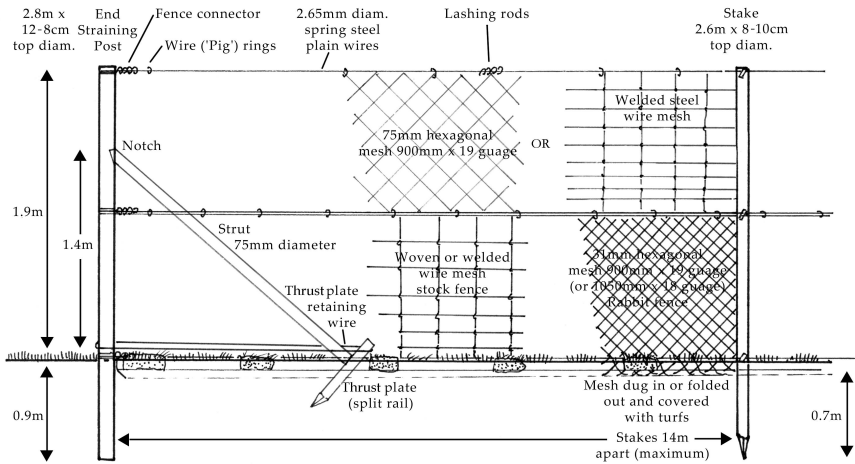
### *What threatens young trees?*

Young trees are vulnerable to several dangers. Particularly damaging are browsing animals, such as rabbits, hares, deer or, indeed, livestock. If they are present newly planted trees must be protected. Some of these animals will also gnaw or strip bark.

Protection from late spring frost, drought or strong winds are largely outside one's control. Overcoming frost and drought problems is mainly resolved by choosing hardy species to plant and, for example, not planting in a frost pocket or on thin soils that readily dry out. Protection from insect pests and diseases is usually not needed. There is a nasty weevil that costs owners of commercial forests a lot of money to control, called *Hylobius abietis*. It has a predilection for the bark of very young conifers (and other species), but it usually isn't worth doing anything about it when planting only a few trees and, anyway, on many sites it doesn't cause any damage at all.

### *How do I stop animals causing damage?*

The main choice is between fencing or individual tree protection. For individual protection there are many proprietary products to choose from. All are variations on a theme of plastic tubes or plastic mesh. The main consideration is the browsing animal itself and the height it can reach. For rabbits and hares a 60 cm high guard is sufficient, for roe deer 1.2 m, and for red or fallow deer 1.8 m. Very roughly, use individual guards if you need to protect fewer than 1000 trees, but consider fencing if you're planting more than this in one block. The basic specifications for a rabbit and deer proof fence are sketched here. Typically a contractor will charge £5–10 per running metre to erect such a fence.



*Rabbit and deer proof fence showing typical specifications. You will only need this if you are into serious planting. For small numbers of trees use individual tree protection*

Smearing repellents on the growing shoot of a tree is a nice idea though the only useful product is called 'Aaprotect'. It lasts for a few months but only affords protection to the parts of the tree actually smeared. Synthetic lion dung and other seemingly fearsome smells have been much hyped and, on the whole, found much wanting!

I am going to insert here an aside about a topic that doesn't fit happily elsewhere in this small book: the control of an animal that is the scourge of broadleaved woodlands – the grey squirrel. This menace from North America strips bark from oak, beech and sycamore trees (and many other species) and will attack trees as small as the thickness of one's arm to nearly mature ones. Damage occurs mainly in May, June and July. If uncontrolled they can ruin a promising stand of trees disfiguring and sometimes killing them.

Grey squirrels have been designated a pest since the 1930s. They are controlled by poking their nests (dreys) and shooting animals that emerge, by trapping them, or by poisoning with warfarin. The law is strict about what can and cannot be done. Even if you like grey squirrels in your garden, they are no friend in your wood. They damage your trees, probably raid birds nests for eggs, and may harm other wildlife.

Now back to your newly planted trees.



*When should such protection start?*

On the day you plant your trees! All too often planting has been done one day with the intention of installing protection the next only to find devastation occurs that very night. Animals familiar with a territory soon know that new and succulent plants have arrived – there is some evidence that freshly planted material actually emits chemicals that can be sensed. Some years ago I planted six fine young cherry trees in my wood and I thought I could get away without protecting them. Within twenty-four hours each was sought out and nibbled or bark stripped. Don't wait for damage before giving protection.

*Do I need to worry about competing weeds?*

Yes, this is important since weeds compete with young trees for moisture and nutrients and, if they grow tall, for light as well. Some weeds such as wild clematis and wild honeysuckle will also entwine and even overwhelm saplings.

*How are weeds controlled?*

Weeds are best controlled by killing them either with herbicide, by applying a mulch (a material placed on top of weeds to suppress them), or by hoeing around the tree. Just cutting weeds is ineffectual. Many owners of small woods will not want to or really need to use herbicide, particularly if you have willing labour to hand! If you do go down this route, use a proprietary herbicide, such as round-up (glyphosate), but take great care to avoid any of the herbicide getting on to the tree. If weeds were got rid of before planting, one application of herbicide in late June or early July will usually be sufficient to kill weed regrowth that has developed. Do read the label for instructions and follow them to the letter. Herbicide can be applied either with a directed spray or wiped on with a device that has a wick moist with the herbicide.

A good alternative to herbicide, particularly if you only have a few trees is to use mulch. Many materials are suitable, such as bark chips, black plastic, and even old carpet placed around the tree. Make sure that inert mulches like black plastic are thick enough e.g. farm silage wrap, and well pegged down. Organic mulches should be 6–10 cm deep; a light mulching is useless as weeds



simply grow through. One attractive combination is to use plastic sheeting as the main mulch and then sprinkle bark chippings on the surface both to keep it in place and as a disguise. Mulching is best done at the time of planting.

Cutting or mowing weeds is not very effective in relieving stress to young trees. Although cutting reduces competition for light, it usually worsens it for moisture and nutrients as new weed growth with new demands is stimulated. Just think of a lawn: for as long as it is kept green by mowing it is necessarily drawing moisture!

*How far from a tree should weeds be controlled?*

Control weeds to a distance of about 60–70 cm from the young tree or a diameter of 1–1.5 m. There is no need to kill all weeds between rows of trees, just concentrate on controlling those immediately around the tree itself.

*How long will weed control be necessary?*

Continue weeding until the tree is about 2 m high. This will usually be for about 3 years, and one weeding per year, provided weeds are killed, will usually be sufficient.

*Do I need to replace trees that die?*

Not necessarily. Since over the life of a stand of trees one will usually thin them out at intervals, it is not necessary to replace every tree that fails in the first year or two after planting. A rule of thumb is to replace failures if more than one in five dies. Less than this, and the odd death doesn't matter.

### **Starting trees from scratch – Seeds, Seedlings and Tree nurseries**

As we've noted, most trees start life as seeds sown in a special forest nursery where they are cared for until robust enough to withstand planting out on the site where they will spend their life. This is very different from growing corn or cultivating vegetables where a seed is usually sown in the place where the plant is to grow. However, sowing tree seeds directly on a site to be restocked can sometimes work.



### *Sowing seeds directly*

One can be tempted to find one's own seeds – acorns, beech nuts, seeds that fall out of a dry pine cone etc. – to sow directly into the soil; after all even 30–50p per plant from a nursery sounds expensive when wanting to plant hundreds of trees. But sowing directly is more difficult than it might appear and I list the reasons why, as a reminder of what we need to think about when establishing trees.

- You can't be sure seeds are viable and often only a few will germinate
- Some seeds such as those of ash need cold, moist stratification<sup>2</sup> to germinate well
- Sowing depth can be critical, neither too deep nor too shallow, but this varies between tree species
- Seeds are eaten by mice, voles, birds and squirrels and you need to sow many times more than the number of trees you hope to establish
- Tender seedlings that do emerge are easily swamped by other vegetation or may be browsed
- Seedlings from seed sown in a wood generally grow much more slowly in the early years than those from a nursery

For all these reasons it is far, far safer to buy and plant healthy young trees, already 1–3 years old, that have been raised in a special nursery with the care this affords. They will continue to grow faster for several years than seedlings in a wood.

If one is anxious to save money at this stage, then dig up wild seedlings, called 'wildings', from elsewhere in your wood and use these. Do it properly by excavating a decent root ball and planting the tree in the new location as soon as possible. It is time consuming and, of course, one is restricted to what wildings are to hand. You often find that such self-sown seedlings have astonishingly long, straggly roots that are difficult to dig up. Their lack of fibrous roots slows establishment and early growth.

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<sup>2</sup> Stratification is the storage of seeds at just above freezing temperature in damp sand or peat for several weeks or months to mimic winter soil conditions. This 'pre-chilling' is required for species with deeply dormant seed to improve germination when sown.



### *Your own nursery*

It can be enormous fun growing your own trees from seed. Your friends can help too, sowing acorns in flower pots and bringing to plant in your wood as trophies and trysts of friendship! But if you want to grow you own seedlings for a significant planting you will require a site which is quite demanding in its requirements, but will often be met by the corner of the vegetable patch in your garden! The key requirements are:

- full protection from browsing animals – voles, rabbits, hares and deer;
- full protection from seed predators – mice, birds and squirrels;
- access to irrigation;
- soil that is friable and easily worked and kept weed free;
- a location that is not excessively exposed or a frost hollow;
- adequate access.

If you have such a site and want to try your hand, I attempt to do here for tree seeds the sort of instructions one finds on the side of every flower or vegetable seed packet.

A few years ago The Tree Council issued an excellent booklet entitled *'The Good Seed Guide – all you need to know about growing trees from seed'*<sup>3</sup>. It is most helpful and well worth getting if you want to grown your own. It is illustrated in colour and silhouette images, many by John White who has illustrated this book as well as the two telling the story of my own wood! In the booklet's information sources at the back, one cited is John Evelyn's famous *Silva*, published over 300 years ago, and that rather took my breath away!

I will cover here the main topics in brief and content myself with strongly recommending that you obtain the Tree Council's excellent guide.

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<sup>3</sup> *The Good Seed Guide* published by the Tree Council in 2001. ISBN 0-904853-01-2 The Tree Council's address is 51 Catherine Place, London SW1E 6DY Tel: 0207 828 9928 Fax: 0207 828 9060 Website: [www.treecouncil.org.uk](http://www.treecouncil.org.uk)



### *Where to get seeds from*

If you want to collect your own seeds, obtain them from several different trees of the desired species not just from one, and from trees that are healthy and of good form. You can also buy tree seeds from certain nurseries. Whatever you decide, supplies of seed from year to year are not consistent since most trees only fruit heavily at intervals.

### *Sowing seeds*

When – sow seeds in mid to late spring once risk of frost in past.

Condition of bed – prepare soil into a tilth, clean away all weeds, incorporate a slow-release compound fertiliser high in phosphate (P), but don't over-fertilise.

Quantity – aim for 100 seedlings per square metre of bed or sow 2 or 3 per container.

Depth – sow small seeds, such as birch, on the surface and very lightly cover, larger seeds, such as acorns, should be sown to a depth of 1 to 1½ times their longest dimension. They needn't be placed point upwards as they naturally germinate on their side.

Seed covering – cover seed to prevent birds eating them and help keep them moist. Use sand or grit that is on the acid side of neutral, not chalky. Sandy loam will do.

Watering – Irrigation is critical, but mustn't be overdone. How much depends on weather conditions: the bed or container soil should neither be soggy nor dry and dusty.

Protection from mice and birds – Use netting to keep birds away in the precious days and weeks between sowing and germination: a cat might deal with both threats!

### *Germination*

Germination of seeds never occurs uniformly owing to the seeds' condition, the nature of the seedbed, and other factors not under





one's control. Germination time varies between species. Expect some seeds to germinate a few days early, most to come up at about the average time and a few to be slow and only emerge as time goes on. There will be a definite peak when most come up. In the days after germination provide shade if it is at all warm and sunny since young seedlings are very tender.

#### *Weed control*

Seeds of weeds, by their very nature, often germinate quickly, grow rapidly and soon overtop your tiny trees so they must be helped at this critical phase. Pull up all weeds. Do this once a week for the first couple of months and then as conditions dictate.

#### *Thinning out and pricking out*

When sowing flower or vegetable seeds we are used to thinning out seedlings to give the remainder room to grow. This is less common in tree nurseries except when using containers and you only want one good plant in each. If you are thinning down to one plant per container use the surplus seedlings to make good any containers that are empty. This operation, a form of pricking out, is best done when seedlings are small 'matchstick' size. Ease the seedling from the container soil and straightaway re-pot it in the new container using a miniature dibble, such as a small stick about the thickness of your little finger with a pointed tip. No time should elapse between lifting and re-potting the seedling apart, possibly, from a brief dunking of the roots in clean water. Do the work in the shade. These precautions are essential: it doesn't matter how careful you are as lifting and transplanting will break off many fine roots – the tiny tender roots and root tips you can only see with a hand lens. Without these the seedling will struggle until they become re-established again in two or three days time.

Freshly pricked out and re-potted seedlings should be kept shaded, but not in the dark, for a week, though the amount of shade can be reduced after about three days.

#### *Transplanting and undercutting*

In a small nursery simply use an ordinary flat spade for transplanting. Do it when the plants are dormant, between late



Autumn and mid-Spring, but not when ground is frozen. Sever the roots at a depth of about 15 cm and lever up the plant. Gently shake the soil off, place the seedling in a polythene bag in the shade, and replant it as soon as possible in its new bed for another year's growth. It is now a 'transplant'.

To undercut, use a spade sharpened with a file. Angle the spade down to cut the roots at 15 cm depth, and then withdraw. Undercut in the growing season, say in July.

### *Lifting and despatch*

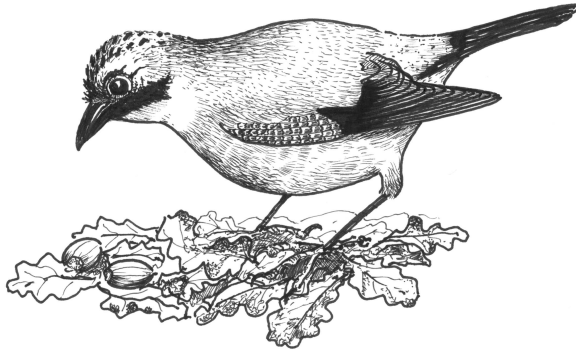
Your baby trees are ready for planting, usually after one or two years in the nursery when they are 15–50 cm tall and 5–8 mm thick at the root collar, and the final job is to lift them. With a small number of plants, simply repeat the transplanting operation to extract them from the bed, gently shake off soil and place them carefully in polythene bags kept in the shade. Provided plants are dormant when lifted and are kept in a cool dry place – and not at risk from frost – they can be stored for up to 2 months before use.

Now follow the operations for normal planting we outlined earlier.

If all the above operations proceed as planned, you will have the immense satisfaction of growing trees from the very seed you collected. There is no surer way of being certain of their origin and perpetuating the trees and shrubs you want to.

## **NATURAL REGENERATION**

Most kinds of trees in Britain readily set fertile seed that falls or is carried by wind or birds to become the next generation of young trees. We all know someone whose lawn is seemingly invaded year after year by sycamore seedlings or baby oaks germinating from acorns, or how a patch of bare soil or a neglected corner soon sport some healthy birch or ash. Such 'volunteer' trees are called 'natural regeneration'. In our wood this free good is mostly the occasional birch and ash, except on the south side where carpets of sycamores have arisen thanks to seeds from a couple of large, old specimens nearby.



*A jay, the master of oak natural regeneration*

But are free seedlings like this always welcome and when should one utilise them? Firstly, the trees may not be growing where they are wanted and there's no point in encouraging trees to grow simply to fill up some land. One can dig up such self-sown trees and transplant them but, as mentioned earlier, you will find that even small ones have roots that will have taken a strong hold and often penetrate to a surprising depth. Experience shows, however, that even with great care such 'wildings' often don't grow very well.

Secondly, not only may self-sown seedlings not be of the kind of tree one wants but also they are not always found growing on a site suited to them. A common example is ash which springs up in dense thickets on many freshly exposed road and railway embankments. Despite their profusion they will not develop well on such sites and neither highway authorities nor, certainly, Network Rail, will welcome them either!

Where natural regeneration comes into its own, is when one wants to perpetuate the local tree stock, perhaps for reasons of conservation. Using self-sown trees continues the line of the parents and this goes back generations – centuries in the case of some trees – and so is a genetic link with the woodland heritage of an area. This is mainly a concern with native species and provided the stock is adequate for all of one's tree growing objectives.

Deliberately encouraging natural regeneration is tricky. As a way of regenerating woodland it is attractive, but seeds may not be available in the year you want to begin and even if there is plentiful seed fall, it may not survive the ravages of scavengers such as mice and grey squirrels. The ground needs to be prepared



by light cultivation and you will need to control competing weeds. Perhaps the best advice is simply to take advantage of any regeneration that does appear rather than trying to make it happen. Even experienced foresters can fail to regenerate stands by natural means!

## **WHAT MAY NEED DOING AS A STAND OF TREES DEVELOPS**

Here we look at four silvicultural operations that a stand of trees may require at some stage. They are not equally important. For example, high pruning may only be needed for reasons of rideside safety or if you hope to grow high quality timber.

### **Cleaning**

Cleaning makes us think of washing clothes, tidying our homes, scrubbing a work-surface, or polishing the car, but in forestry parlance it has a special application. Cleaning is the job of removing unwanted growth in a stand of young trees that's past the establishment phase but before trees are big enough to be usable, say when 3–7 m tall. It is an operation that should follow weeding but is commonly neglected although much needed in young woodland. It is ideal autumn and winter work and can be done reasonably safely with hand tools such as saws, hand axes and billhooks, secateurs or pruners. Anything from a tiny group of perhaps a dozen trees upwards will benefit from cleaning.

Cleaning is all about sorting out a stand of young trees to help those you want to succeed at a time when those not wanted are small enough to be dealt with by hand. I thought the best way to illustrate it is to reproduce an extract from Chapter 15 of my book *'What Happened to Our Wood'*. The chapter is called *'Cleaning Taid's Wood'*. I've added some headings for clarity.

#### *The story so far*

In 1987 my brother-in-law and I planted four acres of new woodland with a mixture of ash, wild cherry and oak trees.



We called it Taid's Wood after my father. The trees grew vigorously in their early years with each individually protected by the then latest device, the plastic tubes or treeshelters, that today litter so much of our countryside. The treeshelters worked well, hardly any trees died and many grew nearly a metre in height each year.

Sporadic removal of treeshelters began in the mid-1990s as the cherry trees quickly swelled to fill the tubes. Removal of all of them from Taid's Wood began in January 1999. But, once de-sheltering was complete, we rather neglected this part of our wood.

### *The problems neglect of woodland can bring*

Neglect can be damaging for broadleaved stands like ours. Unlike most conifers, species like oak, beech, and ash often fail to develop a straight stem unless deliberately helped by the way the trees are grown and cared for. Straight stems are encouraged by growing trees close together, to force upward height and suppress heavy side branches by mutual shading, by selecting trees of good genetic stock, or by formative pruning. In Taid's Wood although we had planted the trees about 3m apart, coppice growth of sycamore and some hazel did in places provide the desired more densely stocked conditions. But using other woody growth runs the risk that it will dominate, and even suppress, the planted trees. It's like allowing moss to green up bare patches of lawn only to find it takes over everywhere. Thus a time comes when a stand of trees needs sorting out, and the job is called 'cleaning'. It brings in no cash but lays the foundation for the future crop, and is a job neglected at peril. In Taid's Wood serious cleaning began in the winter of 2000. The best ash and cherry were already 10m tall and the oak about 7m.

### *What the cleaning entailed*

Initially, one is hesitant in deciding what to cut but over several half days work, six distinct activities evolved. It was like tidying the garage, the more one does the more is discovered that needs attention and the whole job takes



longer than intended. The main task in Taid's Wood was to cut regrowth of sycamore and hazel and self-sown birch and sallow that competed with the planted ash, oak and cherry trees. My small Stihl chainsaw, lightweight with a short 12" guide bar, proved ideal. Stem thickness rarely exceeded 3" and with a well sharpened chain the saw cut through in seconds. With head down and felling several coppice stems in quick succession a rhythm develops though at the risk of being overzealous. Not only is there the question of safety, but the need to consider carefully each stem to be cut, since not every unplanted woody stem is necessarily unwanted. With the fairly widely spaced trees there was still benefit to be had from extra stems to make good any gaps and, in a few places, to substitute the planted tree if it was poor. It was important continually to keep an eye on the surrounding trees where one worked and always on the look out to recruit a new stem. Several well-grown sycamores were added in this way. The grand object was to secure the future of all the best trees and sometimes bring into the reckoning a new one. By cleaning, an unmanageable thicket was turned into a young stand of forest trees.

A few of the planted trees, although growing vigorously, had such badly shaped stems or ungainly crowns of branches that no amount of formative pruning would produce anything worthwhile. These 'wolf' trees are best cut out during cleaning. If not, they occupy much space and interfere with better formed adjacent trees. Perhaps one ash in twenty was culled – 'de-wolfed' – from Taid's Wood and one in fifty of the generally better cherry trees. None of the oaks was really big enough to merit the de-wolfing epithet and also they were being grown in a different way from the rest of stand.

Tiny groups of oaks had been scattered throughout the matrix of ash and cherry trees at 14m centres with the intention that oak will form the final crop. At each centre three oaks were planted in a tight triangle with the idea of selecting the best. A choice of one out of three for oak, with its generally poor form, is really too few. I hoped to get away with it because the acorns had come from good genetic stock and the activities of cleaning and formative pruning at the right time had been factored in. Assuming I was around,



Taid's Wood for one would not be neglected! As cleaning proceeded the triplets of oak were inspected and one or even two of the trees cut out if there was already a clear winner. However, for a few groups it was too late and all three oaks, with their slower growth, were dead or nearly so, suppressed by vigorous adjacent ash or sycamore.

All the while cleaning proceeded, the job was repeatedly interrupted by the strings and ropes of *Clematis* that entangled the undergrowth and ascended into the crowns. Sometimes they stretched from tree to tree like rigging on a sailing ship, but without the order and purpose, and would prevent cut stems falling to the ground. The problem was not serious since during establishment of Taid's Wood killing *Clematis* had been a priority. Nevertheless, dealing with this temperate vine was a crucial part of the cleaning. Tough stems, an inch across, were cut near the base and, importantly, the climber itself was pulled down from every tree it had assaulted. On one wintertime visit it was almost fun. Ben, our youngest son, had come to help and took on the climber-pulling task. It was the Saturday before New Year when most of the country was still in the grip of snow and ice. The trees in Taid's Wood were not only gripped by *Clematis* but still, albeit loosely, by Wednesday night's snow. Cutting any woody growth with the chainsaw sprinkled snow but Ben, yanking and pulling down *Clematis* repeatedly got showered! At least the snow did lubricate the branches so that the whole vegetable mass slid off the tree quite readily, and the hard work kept us warm.

The final cleaning task was to revisit all the better trees. While several ungainly 'wolf' trees were felled, many ash and a few of the cherry were forked or had heavy branches that interfered with less vigorous but better formed neighbours. Although the offending limbs were often rather large – ideally pruning should be confined to branches less than 2 ins across – removing them gave room for adjacent trees to develop. When the first proper thinning takes place in a few years time the future of these partially de-limbed trees will be re-considered, and many will probably go. As with thinning, the intensity of cleaning and what is removed is an open question. Very thorough cleaning and removal of all the poor trees, could make a lightly stocked stand decidedly gappy



and moth-eaten. As with most forestry tasks today's handiwork will be judged many years into the future.

## **Pruning**

In woodland operations there are three situations when pruning might be undertaken, but none is essential compared with pruning roses, grape vines or fruit trees.

- While cleaning a young stand of trees, singling a fork in the main stem of an otherwise desirable tree is a pruning that can be done with secateurs or long arm pruner.
- For reasons of safety and good access, pruning branches from ride and track side trees is commonly needed.
- When growing high quality timber side branches are pruned from the lower trunk to a height of about 4–6 m to restrict the knotty core of timber. This is done early in the life of the stand while the trunk is no more than 10–15 cm thick.

### *When to prune*

In terms of season, pruning can be done at any time though it is best to avoid late spring when copious sap flow can occur. For walnut and wild cherry trees pruning must be done in June or July to minimise disease risk.

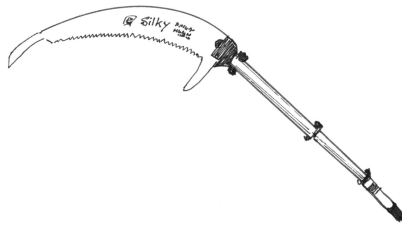
In terms of size of tree, this will depend on the purpose listed in the bullet points above. One rule-of-thumb is that it is best not to prune branches bigger than 5 cm at the base, otherwise the wounds take years to heal over and readily become infected and start to decay.

### *How to prune*

The aim is to sever the branch cleanly close to the stem. Do not do this absolutely flush but angle the cut slightly outwards beginning just outside the branch bark ridge – the zone of creased bark at the junction of branch and trunk.

Special long-handled pruning saws do the best job since one wants to cut through not tear the bark. Lopping with an axe is dangerous and generally damaging.





*The pruning saw I use, it's a superb tool*

### *Use of sealants*

Although painting a sealant over a pruning scar feels as if you are providing a protective bandage, research has shown that little is gained, either in preventing disease or hastening the callus that heals over the wound. Spend time on doing the job carefully and cleanly not money on proprietary sealants.

## **Thinning**

This topic and the next one, felling, are touched on only briefly. Both are major operations that require professional advice, trained operators and are usually done by contractors. What I will do is explain the idea and point you, I hope, in the right direction.

### *What is thinning?*

At planting, or from natural regeneration, commonly two or three thousand trees are established per hectare. Yet at the end of a tree's life – at its rotation age – 50 or 100 or more years later when it is big and ready for the market, only 50 to 250 trees per hectare are left. The process of reducing the stocking of trees down to this small number is the operation of thinning. It is done at intervals as the stand of trees gets older and older.

If you are wondering why one starts out with so many trees when only about 10% are wanted at the end, there are three main reasons: to occupy the available ground quickly; to provide a wide choice of trees from which to choose the very best; and to prevent individual trees developing thick, heavy branches and a spreading



crown which happens if, in early life, they are spaced far apart without competition from neighbouring trees.

*How do you thin a stand of trees?*

The grand aim is to remove the worst and leave the best. One cuts out dead, dying and diseased trees and those of bad shape. Also one tries to favour the best trees by opening up around them to give their crowns space to grow.

If you open up a stand too quickly by thinning very heavily, the remaining trees – the ones you are wanting to favour – will be blown about, snap off and sometimes be uprooted. Thus it is usual only to thin out (remove) about one-third of the trees in a stand at each thinning.

*When do you start thinning and how often is it repeated?*

Thinning begins when trees are 10–12 m tall and are big enough to sell for firewood or pulpwood. To begin with the operation is repeated every 3–5 years but as the trees become large and nearer to maturity the frequency of thinning is reduced to every 8 or even 10 years.

*Does thinning earn money?*

Yes, usually, but not a lot. Because trees are being cut out from among others left standing, the operation is quite tricky and the total amount of wood obtained per hectare may be only be 20–40 tons, thus merchants or contractors won't pay a lot for thinnings. Worse, when trees are small in the first or second thinning you will be lucky to get any income at all since the cost of doing it may be more than the trees are worth. However, by thinning you are improving the crop for the future, so it is best to do the job when you can and not wait in the hope of a better price round the corner.

## **Felling and starting again**

In commercial forestry trees are felled at the end of the rotation. Usually in Britain all the trees in a stand are felled at the same time: this is called 'clear felling'. It is a drastic change to your



woodland but is the most profitable way if this is important. After felling the ground is replanted unless natural regeneration is present or can be expected.

Because clear felling is a sudden and total opening up, there is a trend towards less severe forms of intervention. Most are covered by a new term 'continuous cover forestry'. As the name implies, trees are felled and regeneration encouraged without completely clearing the stand: some big trees are always left and a woodland appearance is maintained. It is a more intensive system, requires skill, and may be less profitable. One way is to fell small groups of trees and replant in the middle of the openings, another way is to thin heavily among the old trees and develop volunteer regeneration, whilst a third way might be to clear fell most of a stand but leave sufficient old trees to give the appearance of continuous cover, and so on. Which system will work best depends mainly on the site and the tree species involved. Space does not allow more details here. To illustrate the complexity, one can't regenerate woodland using small openings if the species concerned is ash or oak, both of which require plenty of sunlight from an early age, but it could work well with the more shade tolerant beech. That said, trying to establish groups of trees in small gaps is usually doomed to fail. A useful rule of thumb is that the minimum diameter for a gap to be worth planting (regenerating) is  $1\frac{1}{2}$  times the height of adjacent trees.

If you think your trees are mature and your wood has reached the time when it should be regenerated – or you simply want to start again and leave your own mark on the wood – seek professional advice. As I have said before, an hour of a professional forester's time will repay handsomely as alternatives are presented and opportunities discussed.

## **COPPICING AND POLLARDING**

### **Coppicing**

These terms describe cutting a tree near ground level (coppicing) or somewhat above head height (pollarding) – and so out of reach of browsing animals – in order to use the shoots that emerge to form the next crop. The words 'coppice' and 'pollard' are also



nouns that name a crop or tree created in this way. Only broadleaved trees can be coppiced with the famous exceptions of redwoods, monkey puzzles, some cypresses, Chinese fir and one or two tropical pines. Even with broadleaves, coppicing potential and vigour varies. At every coppicing a few stumps die, and species such as beech and common alder generally do not sprout coppice very well. With beech it seems to coppice better in the wetter west parts of the country. Certainly in our wood in Hampshire I have been surprised how many stumps of beech have coppiced following wintertime thinnings in 1997 and again in 2003.

### *Restoring an old coppice*

I begin with this because if you have bought a wood in the lowlands it is quite likely that it was once managed as a coppice. This is also true for many woodlands of native broadleaves in the uplands of southwest England, Wales, the Lake District and western Scotland. Indeed, historians believe well over half of all woodlands were managed by coppicing in medieval times. Yet, today, active coppice management is confined to about 25,000 ha or only one per cent of the total forest area.

A rapid decline in coppicing occurred in the early decades of the last century. This arose mainly from a collapse in markets for tanbark, charcoal, firewood, and rustic products such as thatching spars, hurdles, and besoms. There is now something of a revival of these rural crafts and coppicing is back in fashion along with all its wildlife benefits.

### *Why restore coppice?*

There are several answers to this question. First, coppicing will bring back a neglected rural craft and demand for rustic produce such as hazel spars, hurdles for fencing, whilst poles and sticks for the vegetable garden are on the rise. Secondly a coppice is the perfect renewable and sustainable energy source for firewood or charcoal. Thirdly, and most important for many people, restoration of coppice will promote a wildlife habitat, a theme we return to in Chapter 8.

Can a wood be too small to consider for resuming coppicing? In a word, no. If there are clear signs that a wood was once coppiced,



even a half-acre copse (as the name implies) can be restored again, perhaps as two quarter-acre coupes cut five years apart. If once coppiced, it can be coppiced again.

### *Recognising coppice woodland*

Because coppice uses the regrowth that sprouts from cut stumps, the key to identifying that a woodland is in fact a coppice is to look at the trees and how they appear. In a forest that is *not* coppiced but felled and replanted or regenerated by natural seeding all the trees will have single stems or trunks at ground level. In a coppice things will be quite different. Most trees will be multi-stemmed at or near the base with two or more trunks growing up very close to each other.

Sometimes in a long neglected coppice one tree stem or trunk will dominate and the others from the stump fail to grow much. Often the dominant trunk will appear slightly bent or swept at the base curving up a little from the ground and slightly off-centre. This feature, and the presence of even weak basal shoots, indicate a likely history of coppicing. A good example is the National Trust's lovely Hembury Woods on Dartmoor. They have been well thinned over the last 30 years with the best trunks of coppice origin favoured (a treatment called 'storing coppice') and the woods now look like a delightful high forest of oaks. But careful inspection of the base of each tree shows this off-centre feature of the trunk and often several straggly shoots persisting and growing out of the base – the sure signs of coppice origin.

Where coppicing has been practised for hundreds of years the original stumps will have long disappeared. However, the present trees may still be in multi-stemmed groups and also may make an informal ring with other clumps a bit like a fairy ring of mushrooms and toadstools. What has happened is that at each coppicing the new shoots arise at the periphery of a stump and so it enlarges a little each time.

### *Types of coppice*

Coppices are not all the same. They vary in species composition, in their rotation or length of cutting cycle, and whether or not they have large trees (standards) scattered through them. I give a simple classification below which I hope is helpful. Once you



know the type of coppice woodland you have, then its treatment becomes clearer.

Pure coppice This is a coppice made up of one species. Examples include sweet chestnut, which is common in Essex, Kent and Sussex, hornbeam on the heavy clay soils around London, hazel in many woodlands in the southern half of Britain, and oak woods all along the western seaboard.

Mixed coppice This is a coppice of several species and deliberately managed as such. It is fairly common and is usually a short rotation coppice for producing bean poles, pea sticks, hedging stakes and similar small sized material. Mixed coppices typically contain hazel, birch, willow, hawthorn, ash and sometimes oak, lime, field maple, buckthorn, wild cherry and alder.

Short rotation coppice While there is no strict definition of what is 'short', it is usually accepted that coppice crops cut on a cycle or rotation of less than 10 years is short rotation, typically hazel. However, the name has been hijacked by the energy industry as 'short rotation coppice', or SRC as it is sometimes called, and is recognised today as a special crop of poplar or willow grown for biomass or 'green' energy.

To be strictly accurate, we should mention osiers, where special varieties of willow are cut each year to yield the pliable and wiry 'withies' for basket making. This is still an active local industry on the Somerset Levels.

Long rotation coppice All other coppices are worked on cycles longer than 10 years, and sometimes as long as 30 years, but rarely more. Such coppices include sweet chestnut, cut on a rotation of 12–18 years depending on quality, and worked for fencing stakes and traditionally hop poles, oak on a 25–30 year cycle when it was managed for tanbark, and hornbeam a similar length of time when it supplied firewood and charcoal for industry and the hearths of the home counties. Other coppices managed for firewood, or even pulpwood, would have rotations of 20–30 years to produce pole size material.

Coppice with standards This is a coppice crop within which there is a scattering of larger trees that stand over the coppice or



understorey (called 'underwood' in such circumstances). These larger trees, called standards, are well spaced apart so that the coppice is not heavily shaded. The idea is that both large timber as well as small-sized produce from the coppice are obtained from the site. Coppice-with-standards make an attractive stand and many traditional coppice woodlands were managed in this way.

It is easy to tell whether a woodland today is a neglected coppice-with-standards. As well as having clumps of multi-stemmed trees arising from the base, the big trees present will, very tellingly, have large usually dead branches low on the trunk. Typically these large limbs will be only 6 or 7 m from the ground. This shows that once these trees grew in much more open well lit conditions and not in a dark forest stand environment, even though today they may be in dense woodland. Part of my wood that we call Nain's Copse is like this with an underwood of sycamore and ash, last cut in about 1960, and a scattering of oak standards with only short branch-free trunks.

Standards are carefully managed along with the main coppice crop. Each time the coppice is cut, say every 20 years, the oldest standards will be taken and a few new young ones recruited. Typically a coppice-with-standards will have several age classes of standards that match the cutting cycle. Thus a coppice cut on a 20 year cycle should have a few standards each of 20, 40, 60, 80 and perhaps 100 years old respectively. This is illustrated at the end of Chapter 2 and again here to try and make it clear.



*Coppice with standards showing different ages of standards*

Oak is much the commonest species used as a standard. Ash is also suitable, but beech and hornbeam cast too heavy shade.



### *How to coppice*

This is a wintertime job though it can be carried out later into the spring than planting. Ideally coppicing should be finished by the end of April otherwise the new shoots emerge late in the summer and are still small by the following winter. Cut coppice stems cleanly to near ground level taking care not to damage the bark. Provided the area is not heavily browsed, new shoots (coppice) emerge from the stump, called a 'stool', in late spring. The new shoots may grow 4–6 ft (1–1.5 m) in the first year. Initially many shoots will grow up but these thin themselves often to leave half-a-dozen by about 15 years of age or two or three times this number in the case of hazel.

Standards can be either recruited by leaving the occasional coppice stem or be planted.

### **Pollarding**

The tree is regularly decapitated at intervals of 10 to 20 years and the shoots (branches) traditionally used for firewood or stored for winter cattle feed. The operation fell into neglect and many of today's large, stag-headed, multi-limbed trees are the result. Let's remind ourselves what pollards look like from John White's sketches in Chapter 2.



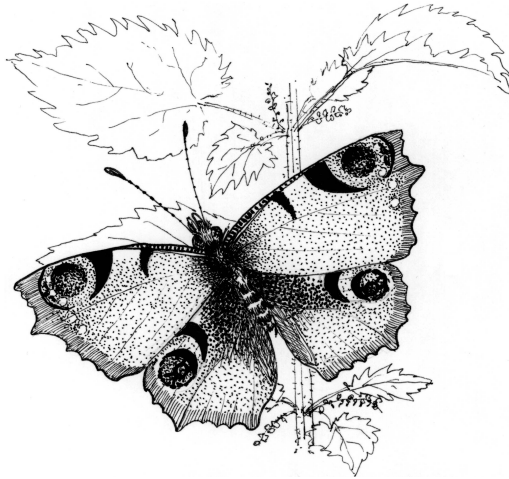
*Different kinds of pollards*

Pollarding is seeing a revival, particularly for riverside willows and there are some attempts to resume the practice on long neglected trees, but it is not at all easy. The trick appears to be only to cut off the branch just above the old cut and not below and into even older wood, but even this will not guarantee success.





Pollarding can create very old and squat trunks, often decay ridden, but still alive and a serviceable shell with an interior home to highly specialised beetles and other micro-organisms. It is a good operation to perpetuate.



*Peacock butterfly with its favourite food, the stinging nettle: at home in almost all working woodlands*