کاری از پویش بونسای

پک کامل کتاب های

Harry Harrington

جمع آوری از اینترنت: بخرد

بونسای بدون برداشت از طبیعت

از آنجایی که هدف گروه پویش بونسای آموزش و گسترش فن زیبای بونسای می باشد مجموعه حاضر که شامل سه کتاب بونسائیست معروف Harry Harrington می باشد را به صورت فرمت pdf تقدیم می نمائیم، امید است که قابل استفاده دوستداران فن زیبای بونسای قرار گیرد.

۱. Bonsai Basics

۲. Bonsai Inspirations 1

۳. Bonsai Inspirations 2

بازنشر مجموعه حاضر با ذکر منبع بلا مانع می باشد.

Harry Harrington's

Bonsai4Me

Bonsai Basics

B4me

Bonsai4me: Bonsai Basics

by

Harry Harrington

Author: Harry Harrington

Bonsai4me: Bonsai Basics

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All text and images by Harry Harrington unless otherwise stated.

Edited by:Harry Harrington

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Introduction to Bonsai4me

www.bonsai4me.com started life as a collection of private notes about bonsai that were first published as 'Species Guides' by Harry Harrington in 2001; the first comprehensive study of plant species suitable for bonsai available online.

Since that time Bonsai4me has grown on an annual basis and now attracts over 1.5 million different visitors each year from around the world.

The success and popularity of the 'Progression Series' (articles and photoseries showing the development of a bonsai over many years) in Bonsai4me.com has led to Harry Harrington writing and publishing 2 books on the subject via B4MePublishing; *Bonsai Inspirations 1* published in 2011 and *Bonsai Inspirations 2* , published in 2012.

Bonsai Basics Introduction

The Art and Practise of Bonsai conjures an aura of mystery and wonder that draws many first-time enthusiasts to it.

Until the 1990's and the onset of the Internet, bonsai enthusiasts were few and far between. Information was very scarce and only available in a handful books written by Western 'Bonsai Masters' who had worked in isolation for many years. There was a lot of trial and error on the part of both these 'Masters' and enthusiasts.

This trial and error period didn’t necessarily lead to good information..... Individuals lacking in basic knowledge and experience (relative to today’s standards) wrote books and the misinformation contained was passed around as gospel. It is no wonder that people who took up bonsai were often confused. It can be extremely difficult to decipher between fact and fiction when even reference books seemed to contradict each other!

With the advent of the Internet, enthusiasts were finally able to link up across the world and compare experiences, improve their overall knowledge and discover many pre-90 bonsai books are inaccurate and in some cases downright wrong! Unfortunately many vendors and 'authorities' on bonsai still hark back to the old days and continue to perpetuate myths and bad practises.

Upon finding that I work as a professional bonsai artist, many people will remark that they once had a bonsai, but it died and with some regret, they gave up.

It is hoped that this book, 'Bonsai4me: Bonsai Basics', will arm those new to bonsai with a solid foundation of knowledge that will enable them to successfully keep their bonsai alive and well, through very simple practises, and continue to enjoy, what for many that practise the Art, is a life-long passion.

Bonsai4me:Bonsai Basics takes the reader through the basics of caring for their first bonsai with honest, simple and straightforward advice from the writer of Bonsai4me, Harry Harrington.

Over 29 chapters, Bonsai Basics offers guidelines on subjects such as placement, watering, indoor and outdoor bonsai, pruning, wiring, repotting and rootpruning as well as fertilizing, wiring and styling.

All based on a website, Bonsai4me.com, that has been widely regarded and referred to for over a decade by millions of enthusiasts around the world.

Chapter 1 An Introduction To Bonsai

The word bonsai comes from the Chinese words pun sai, meaning quite literally ‘tree in a pot’.

Originally a practice of containerising ancient wild trees in China, bonsai was exported to Japan around 500 years ago where it has become an art form. Regarded as a novelty in the West until the early 20th century, Bonsai has now been embraced as a serious horticultural art form by the Gardening Establishment here in Britain and the West as a whole.

Prunus incisa 'Kojo-no-mai'/Fuji Cherry 'mame' bonsai by Harry Harrington

The ‘tree’ can be a vine, a shrub or a tree. A common misconception for beginners is that the plants used for bonsai are ‘dwarf’ plants or even ‘special bonsai plants’. Quite simply, bonsai are everyday shrubs, trees and vines. For this reason, they go through their normal seasonal phases, flowering, fruiting and shedding leaves. Bonsai require the great outdoors in the same way that their ‘untrained’ garden counterparts do.

Trees growing in the wild can elicit a number of emotions in all of us; they can be powerful statements of age and strength as well as beauty as this Cedrus Libani photographed at Tattoon Park in Cheshire does.

Plants have evolved over thousands of years to take advantage of natural light, wind, rain and seasonal changes. Cultivating them in the unnatural environment of our homes mean they have to cope with poor light and low humidity levels. Your tree may be able to ‘exist’ for a few months indoors but it will never thrive. Continual indoor cultivation for outdoor trees nearly always results in death unless the tree is given a position outside to regain its health. There are a few plants that will cope with indoor cultivation for short periods of time; often these are tropical species that require winter protection against the cold, but even tropical species need outdoor conditions after the threat of frost

has passed in the Spring.

Or create a feeling of serenity and calmness as this old Salix caprea growing out over the River Great Ouse does.

Some trees can remind us of lost memories of forgotten times and places as these Fagus/Beech in the Chiltern hills do.

One important concept a beginner has to understand when undertaking the art of Bonsai, is that the plant retains its small stature through regular pruning, without which it will simply continue to grow until it no longer resembles a bonsai but an ordinary garden plant or tree. Though the roots of a bonsai are annually pruned, this is not to ‘dwarf’ it. Root pruning produces a small densely packed rootball that enables the plant to be planted in a suitably scaled container. Without root pruning the plant becomes pot-bound and loses its health and vigour. By the process of removing around 1/3 of the roots each year new soil can be introduced to the pot and room is given to allow new roots to grow.

Bonsai can vary in height from a few centimetres to a metre. There is no strict height limit. It is simply that the tree is cultivated in a pot and creates an image of an ancient tree in nature. A bonsai containing an Oak a metre high may seem large for a ‘miniature’ tree until you consider that Oaks will regularly reach 50 meters when left unpruned!

Not all trees are necessarily things of beauty but will still conjure emotions in all of us; the trunkbase of this old gnarled Quercus robur photographed in Croatia displays so much age and resilience, it is difficult not to admire it.

When first starting out styling and pruning your first trees you will discover

there are many aesthetic ‘rules’ in Bonsai, however these should only be regarded as guidelines and you should try to observe and replicate the image of trees that are around you. Try to create a tree that inspires you whilst retaining the feeling that it could actually exist on the side of a mountain or deep in a valley.

A bonsai should create an image which makes it worthy of repeated inspection whilst retaining its natural beauty and shape.

Fagus sylvantica/Common Beech bonsai by Harry Harrington
Current height of bonsai; 22"/55cm
Originally collected by Craig Coussins/Peter Adams during the late 1970's, and grown as part of a forest planting for many years, finally being purchased as a single tree by myself in 2001.

The fine tracery of the branches of the Beech bonsai

Chapter 2 Starting Out In Bonsai

Although bonsai can be very daunting to newcomers when they first start out, in reality it is as simple as you make it. There are many species and varieties of trees available to grow, many new techniques that can be learnt to improve bonsai appearance and a seemingly unfathomable quantity of do's and don'ts, the most important aspect as a beginner is to learn how to simply maintain the shape of your tree and keep it alive.

Learn to look after your first tree successfully and your confidence grows enough to widen your horizons and successfully learn more advanced techniques such as reselling and creating bonsai. But don't run before you walk. The first fundamental rules to learn when embarking on this Art is that you are dealing with something living and ever-changing; the basic rules of horticulture need be learnt before you can successfully maintain your tree.

There are many bonsai techniques available for the bonsai enthusiast to use to reach the ultimate goal of a beautiful tree. Confusingly, information available on the many bonsai web sites and books can often be contradictory. It should be understood that for every objective such as repotting, pruning or styling there are a 100 different techniques or viewpoints. Some are based on horticultural fact, some are based on horticultural myth and some are based on horticultural luck!! In fact many of these techniques will work to one degree or another; unfortunately though not killing your tree, some advice and/or techniques can result in diminished vigour as your trees cope under stress, whilst sound advice based on simple horticultural fact can only improve the health, appearance and vigour of your tree. It is for you to learn which techniques work for you and your tree in your given situation.

Ligustrum ovalifolium/Common Privet Bonsai. Height 15"/37cm. Developed by Harry Harrington from an old hedgerow tree collected in 2004.

Placement

Nearly all beginners start out by buying a bonsai from a garden centre, shopping mall or (hopefully) a reputable dealer and are often given summary advice.

Unfortunately, unless you buy your tree from a reputable bonsai dealer, you may well have started on the back foot. The most common misunderstanding that beginners have (and bonsai forum posts can confirm this) is that Bonsai are still trees and need outdoor living conditions.

Trees need good light, good humidity levels, good air circulation and importantly, many species NEED the cold of winter to go dormant. Inside our homes, trees receive comparatively poor light levels and the dry air/low humidity levels created by modern day central heating systems can cause many problems. There are species that will tolerate indoor conditions and with the correct placement and care can thrive; there are also some species that are not hardy enough to tolerate the winter cold.

But, these are in the minority. It is far more difficult to cultivate indoor

bonsai than outdoor bonsai. Outdoor species very rarely die immediately when grown inside, they can survive for months. However they slowly lose their health and vigour in the adverse conditions they have to cope with, and become susceptible to bugs and disease until they finally start to show outward signs of ill-health; yellowing leaves, lose of foliage and eventually death.

Unfortunately, unscrupulous dealers take advantage of this delayed response to poor care and will display and sell outdoor trees as indoor bonsai. A tree purchased from such a retailer may have been grown inside for weeks or months and can be near death without any outward sign. The most common bonsai to cause problems for beginners are Conifers and very often Junipers. There is NO coniferous species that can tolerate indoor cultivation for more than 2 or 3 years. It is worth referring to individual plant/tree Species Guides to establish whether you have a tree that can be grown inside or not.

Juniperus chinensis 'San Jose' Juniper bonsai. Height 17"42cm, trunkbase diameter 5"/12.5cm. Styled over 3 weeks during late 2011 by Harry Harrington

Watering

This seemingly easy technique is the second most common cause of Bonsai-related problems. Underwatering or allowing the compost to dry out completely will instantly kill or badly damage most trees; however 'overwatering' can just as equally cause ill-health and eventual death from rootrot and disease.

'Overwatering' is something of a misnomer; if a bonsai is planted in well-drained soil it is literally impossible to overwater. Rootrot is the result of a tree growing in poor-draining soil that remains wet and importantly, is airless, causing the roots to die.

The most important rule to remember is that trees should be CHECKED for their water requirement daily but should only be watered as required. Never, never, water to a routine, this can lead to continually sodden compost which literally suffocates the roots. The surface of the compost MUST be *starting* to

dry out between watering, then the tree can be thoroughly watered again. The time between watering can vary from 12 hours to 7 days depending on factors such as prevailing temperatures, wind and humidity levels.

Small-Leaved Lime/Tilia cordata bonsai. Height 22"/56cm. Developed from a pencil-thick sapling by Harry Harrington since 2001

Fiddling

Don't fiddle! The temptation for beginners is to continually fiddle with their tree(s), cutting bits off here and there, continually watering, misting, moving them around etc *etc.* Checking daily for water requirements and possible health problems is necessary, but otherwise leave the tree to grow and simply enjoy it.

Pruning back to shape is necessary but don't continually jump onto every out of place leaf. In order to keep the tree healthy and vigorous it needs to be able to grow freely at times. It is also important to remember timing is very important, don't carry out jobs such as repotting or major restyling at the wrong time of the year as this can lead to poor health in the tree and lack of vigour. A tree repotted at the wrong time of year for instance may survive if you are lucky, it may even

grow a bit, but, it will very rarely reward you with vigour.

Pruning and Repotting

Bonsai need to be pruned, this keeps them small, an unpruned bonsai simply becomes an ordinary tree. This is an area that you need to investigate once the basics of watering and placement are understood. If at first you are unsure, simply prune back your trees' new growth to its' original shape when it has extended but don't prune every new leaf that appears as it appears. By studying your tree, watching its growth patterns and studying other peoples trees on the internet and in books, you will be able to form a mental picture of how you wish your tree to develop over the coming years. It may be that you wish it to remain as it is, or, that there are areas that could be improved. You need to establish your goals for the tree in order to be able to prune and style it for the future rather than just randomly cutting areas of new growth.

The other area of bonsai that needs to be addressed by the beginner is repotting; a very straightforward technique if carried out correctly and at the right time. Most trees need to be repotted annually or at very least bi-annually in Spring as the years new growth starts to appear. Trees that are not repotted will eventually lose their health and vigour.

Many beginners trees can also be found to be planted in very poor soils; they will need repotting into better quality soil.

Crataegus monogyna/Common Hawthorn bonsai, collected and developed since 2004 by Harry Harrington. Height 28"/70cm

Age

How old is my tree? The ONLY way of accurately ageing a tree is by counting the tree-rings at the base of the trunk, obviously this is not possible! Normally the age of a tree can be reasonably estimated when a tree has been owned by the same person who propagated it from seed or a cutting; nursery stock can often be estimated reliably at being 2 or 3 years old when bought from a garden centre.

Old branches that are removed can also have their rings counted which can also give an indication of the age of the rest of the tree.

However, with increased age in bonsai comes increased financial value and this does not always result in complete honesty. There are many bonsai techniques available to the experienced collector that help give the impression of

great age; that is after all one of the principal aims when styling and developing trees.

Field-grown trees for instance will always display far thicker trunks than trees that have always been grown as bonsai. It is fairly straightforward to create a bonsai from a cutting that after 10 years looks older than a 30 year old container-developed bonsai.

When valuing a tree, it is not its actual age that is most important; it is the impression of age that gives it beauty.

These basics are described in greater detail within the following chapters and it is hoped that armed with this knowledge you can keep your bonsai healthy and provide a platform from which to learn a whole new art form. Good luck!

Chinese Juniper/Juniperus chinensis bonsai styled by Harry Harrington
Height 18.5"45cm with a 9"22cm diameter base.

Chapter 3 Indoor Bonsai

There is no such thing as an indoor bonsai or an indoor tree. All bonsai are naturally outdoor trees and as such are better cultivated outside. The only exceptions are tropical species that can not tolerate lower temperatures at certain times of the year and, without an artificial source of warmth, would perish.

It is a relatively common sight to see indoor displays of Bonsai in books and magazines but it should be understood that these are only temporary. In Japan, Bonsai are commonly brought inside for 1 or 2 days at a time and are shown as a part of a tokoname display before being returned outside where they can recover.

Bonsai being shown, temporarily, indoors at a bonsai show. The vast majority of these trees are normally outside, in all weathers, throughout the year

There are two main reasons that temperate climate bonsai are not kept inside for any length of time. Firstly, all deciduous and coniferous trees need a period

of dormancy which is only triggered by cooler temperatures. Without this dormancy, trees can continue to grow for anything up to 2 years before going dormant whatever the season or temperature; this enforced dormancy can often be fatal.

The leaves of an English Elm bonsai turning yellow as the tree enters dormancy. Ulmus minor bonsai, 17"/42cm in height,by Harry Harrington

Secondly, it is difficult to provide adequate growing conditions for trees indoors. Inside, light levels are lower, humidity levels are very poor and trees suffer from lack of air circulation. For species that are hardy to frosts, it is far better to cultivate them outside all year round where conditions are conducive to their health and vigour.

Tropical species of bonsai on the other hand require temperatures above around 10-15°C (depending on individual species). In cool temperate areas of America and Europe this can mean that many tropical bonsai can only be kept outside for 2 or 3 months of the summer, the rest of the year adequate care must be provided inside.

Light

Indoors, light levels are very poor. Though imperceptible to the human eye, light levels drop rapidly the further you are from a natural source of light. It is

said that light levels halve every 50cm further from a window you are. This means that for most tree species light levels are too low, even when stood on a bright windowsill. It needs to be understood that glass filters out many of the UV rays that plants require for the process of photosynthesis; many trees species can fail to receive enough light on a south-facing windowsill even though the heat of the sunlight is burning their leaves.

Trees that do not receive enough light will fail to grow strongly if at all. Any growth that is produced will tend to have long internodes and become 'leggy'. Leaves will be over-sized in an effort to catch maximum light.

Sageretia theezans/Chinese Bird Plum by Harry Harrington. Sageretia are a tropical species that require protection from temperatures below +10ºC and are grown indoors between September and April each year.

Some tropical species however are used to growing on the forest floor (ficus/Serissa/Sageretia amongst others) in their natural habitat where there is naturally little light and these will cope with lower light levels indoors.

Trees grown indoors should be placed on sunny windowsills and/or provided with overhead fluorescent lamps. This should be sufficient for many tropical species but will probably still be too dark for ordinary woody temperate species.

Ordinary fluorescent lamps or aquarium lights kept about 6 inches above the tree for 12-16 hours a day can be used to supplement light levels.

Do not place trees on windowsills that are closed behind curtains at night, the temperature in between the window and curtain can rapidly drop below room temperature during the night.

Detail of the Sageretia trunk

Dormancy

As previously stated, woody temperate-climate plants require a dormant period. This is a period of at least 42 days where temperatures are 10°C or lower. Most deciduous trees will lose their leaves at this time whilst some others such as Ulmus parvifolia, the Chinese Elm may remain evergreen. Evergreen species, in particular conifers will slow their growth rate considerably.

However, tropical species do not have a dormant period as such and will continue to grow all year round.

Air circulation and humidity

Central heating systems radically reduce humidity in our homes to near-desert levels. All bonsai need good humidity levels to grow well indoors and there are several ways to address this problem.

Firstly, never place your bonsai above a radiator where humidity levels are especially poor. In general, radiators should be avoided as they also cause wild fluctuations in temperature to their the surrounding environment.

Secondly, trees can be misted to create higher humidity levels. Misting also cleans the leaves of dust and dirt that would otherwise collect. Don't bother however misting religiously everyday, as excessive misting can build up salt deposits on leaves and water runoff can result in over-wet bonsai compost. It is far more important that the surrounding area is kept humid and this is best provided by use of a humidity or gravel tray. This is a flat tray that holds water into which small stones or pebbles are placed. The bonsai is placed on top of the stones so none of the pot touches the water, as the water evaporates over the

course of 1 or 2 days it provides a continual humid atmosphere around the tree. It is important that the bonsai pot can still drain fully and it should sit high enough above the water in the humidity tray to be able to do so.

Pests and Diseases

Trees are just as likely to be attacked by pets and diseases inside as they are out. Bugs that would normally be killed outside during the cold of winter are able to thrive indoors year round!

Special attention should be paid to spider mites which positively enjoy the low humidity indoor environment. Spider mites cannot be seen with the naked eye but their presence can be noted by the appearance of very fine webbing between leaves. These can be dealt with using ordinary insecticides.

Fungus gnats are very small fly-like bugs that can occasionally be found in and around the compost of bonsai, these are nearly always drawn to over-wet composts and can be dealt with using insecticides. If the compost of the bonsai is found to be too wet all the time, consider a change in your watering practices or compost if it is poor draining. Fungus gnats are nearly always brought indoors when moss growing on the surface of the compost is not removed beforehand.

A 30"74cm tall Crassula ovataJade or Money Tree Bonsai by Harry Harrington. Jades are extremely tolerant of poor growing conditions and make easy to care for Indoor Bonsai.

Summary

Growing bonsai indoors successfully is not straightforward; many trees can continue to grow seemingly unaffected for anything up to 1 or 2 years before showing any outward signs of distress. However, after this time, trees tend to

showing any outward signs of distress. However, after this time, trees tend to have lost so much health and vigour that they are very hard to keep alive. Do not assume that the tree you brought growing indoors at the garden centre or bonsai retailer will grow indoors on a permanent basis. Very often, outdoor species are sold in an indoor environment simply for the convenience of the retailer. Always ask retailers if your tree is intended for indoor or outdoor cultivation. It should be noted here that you cannot SUCCESSFULLY cultivate coniferous bonsai indoors for more than 1-2 years.

If you specifically require a tree for growing indoors, choose a species that will be more able to cope with this stressful environment. This typically means using tropical species that have little dormancy needs and can tolerate low light levels and poor humidity.

Place your tree on a well lit windowsill that is not shut off at night and is not above a radiator. Ensure that the leaves are not burnt in strong sunlight. Make use of a humidity tray and enjoy!!

Tiny "mame" Juniper just a few centimetres tall, by Harry Harrington. However tempting it maybe to try, coniferous species such as Pines and Junipers will not tolerate indoor cultivation for more than a year or two and must always be placed outside.

Chapter 4 Growing Bonsai Outdoors

Bonsai growing in the author's garden in the North-West of England

The images in this article have all been taken on my journey's around the UK to visit fellow enthusiasts gardens as well images of my own gardens. The majority of tree species used for bonsai require that the trees be placed outside all year round. This means that they need to be positioned somewhere where they will be able to receive direct sunlight for at least part of the day, be protected from strong winds that may knock them over or uproot them and be near a watering point as they will require watering 200-300 times every year.

A view of the author's garden near London, England on a Summers evening

Ficus species bonsai brought outside for the Summer months in London

Living in a temperate climate here in the UK, any tropical or subtropical

species bonsai require that they are housed indoors or in a heated greenhouse from Autumn to Spring (the exact timing dependent on their exact frost-hardiness).

However, all fully hardy bonsai are kept outside all year round with no protection from the elements unless temperatures drop below -10ºC. Allowing your frost hardy bonsai to be exposed to the seasons allows them to grow naturally as they would in the ground and encourages much healthier and more vigorous growth.

The author's frost-hardy bonsai covered in a layer of snow during the Winter

The ideal position for your bonsai is for them to be kept off the ground on wooden benches or monkey poles, and each bonsai is placed in a position where it receives the amount of sunlight needed for healthy growth.

As some bonsai such as Pines require at least 8 hours direct sunlight whilst some bonsai such as Hawthorn or Japanese Maple will tolerate as little as 3 hours direct sunlight, careful observation of the light levels around the garden is necessary. Similarly, consideration of the prevailing winds should be made. Placing a bonsai in an area of the garden that is liable to be hit from the full force strong winds could result in a favourite bonsai (and its pot) being discovered lying in pieces on the ground after a night of heavy storms.

Other considerations for bonsai placement should include more domestic concerns such as the security of prized specimens, footballs from neighbouring properties and the local cat, squirrel, bird, rabbit and deer populations that can all have a terrible habit of damaging bonsai!

A large bonsai collection in Greenford, England

A large bonsai collection in Greenford, England

Finally, when you have a living work of art such as a prized bonsai, it is pleasing to be able to see it in all of its glory out in the garden and the aesthetic value of careful placement of a tree within a garden is worth considering.

Autumn colours in the garden of the author

Following the changes in your bonsai as they go through the seasons is always a delight; from the arrival of the bright new buds on bare branches in Spring to the many green hues of the leaves in Summer to the vibrant red, orange and yellow leaves in the Autumn. And then Winter comes and the fine tracery of bare branches around the gnarled and aged trunk of a bonsai can be enjoyed for 4 months as each bonsai withstands the worst that Mother Nature can throw at them.

A roof-top garden in central London, England

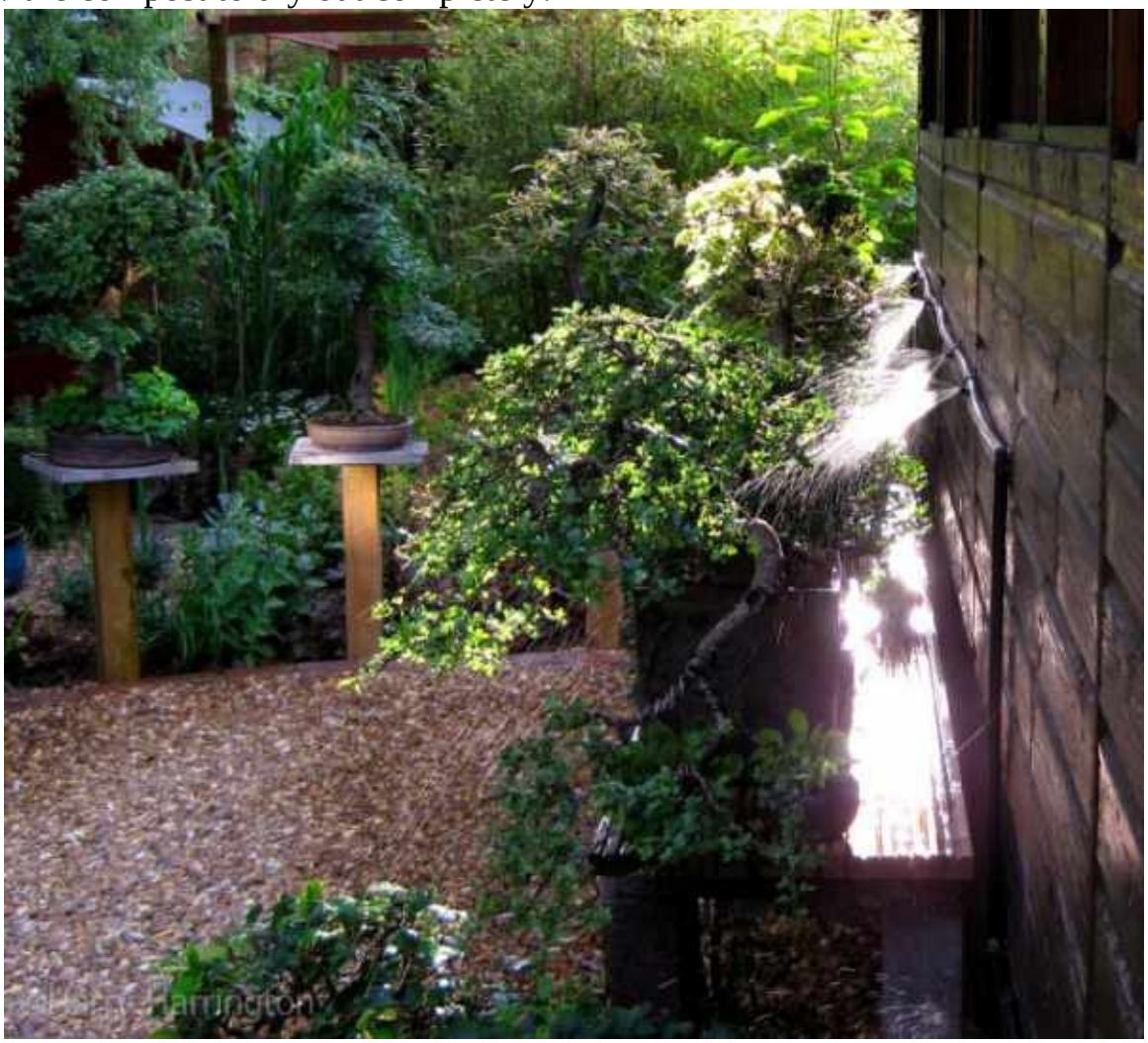
A roof-top garden in Central London, England

Bonsai and Koi in a garden near Luton, England

Bonsai displayed in a garden in Surrey, England

Chapter 5 Watering Your Bonsai

Bonsai, as with nearly all other types of cultivated plant, require moisture at their roots to survive. Without a continual source of moisture, the tree is unable to continue its life process, initially losing leaves, then branches and finally the entire tree can die. Never doubt that the quickest way of killing a bonsai is to allow the compost to dry out completely.



Bonsai in the author's garden being watered automatically during the heat of the Summer.

However, though the effects of underwatering are immediate, overwatering a bonsai also causes ill-health in trees. The effects of continual overwatering takes much longer to become noticeable and can often be difficult to diagnose.

Established plants and trees growing in the ground have the ability to 'adjust'

to their habitat and the quantity of water that is available to them. If there is not enough water available to the root system, the roots will spread out into the soil until enough moisture can be reliably acquired. Thus plants growing in relatively dry areas will have far-reaching root systems that will continue to spread out until a reliable source of moisture can be found.

On the other hand, trees growing in damp conditions where moisture is permanently available in the upper levels of the soil, will tend to have shallow root systems as they have easy access to moisture.

In the confines of a pot, a bonsai loses this ability to self-regulate its exposure to moisture. It is unable to govern how much or how little water it accesses. The compost in a bonsai pot is also far less stable than soil in the ground, the possibility for it to dry out is greatly increased and it is greatly affected by the outside influences such as the weather and the surrounding ambient temperature.

Correctly watering your bonsai is a skill itself and is not as straightforward as one might expect when first starting out. It is often said in Japan that it takes 3 years to learn to water correctly. It can sometimes take three years of tree losses before a bonsai enthusiast realises that it is his/her watering regime that might be the cause!

The Effects of Under-and Overwatering

Plants rely on a continual flow of water to stay alive and to grow. Water is absorbed from the compost into the roots by a process known as osmosis, the water is then pulled up the body of the plant and is released into the atmosphere through the foliage. This process allows the plant to distribute vital nutrients throughout its structure. However, without a source of moisture at its roots, this flow of water is interrupted and the plant structure quickly collapses and dries out. Leaves and branch tips are the first areas to be affected, followed by branches. Finally the trunk and roots themselves collapse and dry-out by which time it is unlikely that the tree will survive without damage. Application of water at this point is often too late; moisture can actually be absorbed out of the roots back into the wet compost in a process known as reverse osmosis.

As previously mentioned, the effects of overwatering a far more subtle and can take a relatively long period of time to detect. Overwatering creates an environment for the root system that is permanently wet. Roots need oxygen to 'breathe' and the presence of too much water reduces the ability of the compost to absorb air. This in turn causes the fine root hairs to suffocate and die. The immediate effect to the tree is a loss of vigour as parts of its root system are unable to grow and/or dieback.

More worryingly, the dead roots start to rot. Naturally occurring bacteria are able to colonize the dead tissue and in very wet composts are able to thrive. As the root system continues to die back from the effects of overwatering, the root-rotting bacteria are able to spread throughout the root system and slow (if not completely stop) the ability of the tree to seal the remaining live root-tips. Gradually the live portion of the root system becomes smaller and as it does it is able to support less of the visible top growth of the tree.

Foliage on the tree will start to yellow and drop; smaller branches will shrivel and die back. As the live portion of the rootball becomes even smaller, it is eventually unable to support the primary branches and the trunk, causing the tree to die.

Rootrot is often only detected at repotting time in Spring. Rotted roots will be found to be black and will disintegrate when touched. The only reliable way of stopping rootrot is to cut away all dead areas of root.

How Often Should I Water?

As has already been discussed, it is important to avoid the effects of underwatering and overwatering. So how do you water a bonsai correctly?

Firstly, NEVER water to a routine. Simply watering on a daily basis without first observing the condition of the bonsai soil is often carried out by beginners following the advice of well-meaning bonsai retailers. Bonsai can indeed require water on a daily or even twice daily basis, particularly in hot weather or early Spring. However, watering to a routine commonly leads to permanently wet compost at other times. If the compost does not lose some of its moisture content between each watering, it means it is permanently wet, leading to problems associated with overwatering.

Instead, trees should be checked routinely (at least on a daily basis), so their water requirements can be observed and they can then be watered when they actually require it. The surface of nearly all bonsai composts change colour and appearance when it starts to dry out. With careful observation, it is always possible to tell whether or not the compost surface is dry or not. This can take anything from 12 hours to a week or longer after watering, depending on a variety of factors such as the surrounding ambient temperature, plant vigour, pot size and whether it has rained or not. In the UK, trees tend to need watering daily during the Summer but with lower temperatures and increased rainfall during Autumn, Winter and early Spring, watering needs can change day by day. Never assume that because it has rained your tree has received enough water particularly during the Summer. Often, it only rains enough to wet the upper layers of the compost.

The correct time to water is when the top centimetre of the compost has started to dry out. With regular observation of your trees on a daily basis, you should be able to apply water when it is actually required. Allowing the compost to dry a little between each watering will ensure that they are not overwatered.

Different trees have different water requirements, try to water individual trees in a collection as they require it rather than en masse.

Fitting Your Watering Schedule Around Work Hours

In the real world, many of us are away from home during the day and are not able to check or water our trees. To allow the tree to go without water for any length of time is disastrous and should be avoided at all costs. Get to know your trees; know which ones are likely to dry out during the day while you are away. Know which trees will dry out if the weather is forecast to be hot or windy. If there is a risk that a tree may dry out during the course of the day; water in the morning before you leave home. (Despite what you may read) there is no reason to base your watering regime in the evening; try making your main watering time in the morning so that your bonsai are well-watered before the heat of the day, and then only water those that require it, in the evening.

The Effect of Soil on Watering Practices

The soil that your trees grow in has much influence on how frequently water is required and on how diligently you must water correctly. Organic soils containing peat or 'soil' are those that are most likely to cause problems associated with overwatering; the soil is likely to be retain too much water. Conversely it can be much more difficult to water thoroughly as water will tend to run off the dry surface leaving the interior of the rootball still dry after watering. Inorganic soils containing akadama, turface, seramis, grit etc are water retentive enough to keep the soil moist for the duration of a hot Summers day and also make the overwatering difficult. In other words, if an inorganic soil is used, the risk of overwatering is greatly reduced.

How Should I Water?

If you allow the compost to dry a little between watering you will avoid the effects of overwatering. When the tree does require water though, it needs a thorough soaking. Avoiding overwatering does not mean just 'moistening' the bonsai soil instead of watering it properly. Each time you water, it is important that the entire rootsystem and body of compost is properly wetted to avoid pockets of dry soil where roots could be left to dry out and die.

The Japanese have an adage for watering; 'For bonsai, it rains two times'. Water should be applied twice; the first watering wets the soil so that any dry soil particles will accept moisture better as they tend to shun water at first. Water

should be applied all over the compost surface until it can be seen to run out of the drainage holes. The second watering should be left for 10-20 minutes by which time any previously dry areas of the compost will be ready to accept water. For a second time, water thoroughly all over the surface of the compost until water can be seen to run out of the drainage holes of the pot. The compost and root system should now be sufficiently wetted until the next watering is required.

Hoses and Watering Cans

If you use too concentrated a stream of water, the bonsai soil is likely to be washed out of the pot. For small bonsai collections, a small watering-can fitted with a fine rose is sufficient to water the soil thoroughly without displacing the soil. Otherwise use a hose fitted with a spray gun set to mist, shower or any setting that will not disturb the soil.

Suitable Water For Bonsai

Water your bonsai with plain tapwater. In areas where the tapwater is hard, occasionally watering with rainwater is useful to rid the soil of any build up of salts, but is not essential, unless the tapwater is particularly hard and white salt deposits start to appear around the pot or trunkbase.

Rainwater can be collected in a water butt attached to the downpipe of a shed or house, though it would be difficult to collect enough water to meet the needs of a large collection on a daily basis. Do not use water obtained from water softeners; many water softening systems increase the volume of salts diluted in the water to great detriment to a bonsai.

Watering By Immersion

Some bonsai sources will recommend watering a bonsai by immersing the bonsai pot in water for a while. This is not a recommended way of watering your trees. Watering by immersion is a way of getting water to penetrate compacted, very poor quality organic soils. If a bonsai needs to be watered by immersion, it is in trouble and particularly prone to the effects of overwatering and weak roots. If a vendor recommends that you water by immersion, suspect that this is because the tree is in poor soil and is therefore difficult to water properly. Also suspect that the tree will be weak, slow growing and very possibly have root-related problems. Make holes in the soil around the edge of the pot using a chopstick or similar, to allow water to penetrate the soil and repot at the earliest opportunity (most commonly during the following Spring) into a better quality (preferably inorganic) soil.

Other Watering Problems

Bonsai composts should always be free draining. Compacted, poor-draining composts can cause many of the problems associated with under-and overwatering. Bonsai compost should be open enough to allow water to penetrate throughout and to ensure that excess water is able to pass out through the drainage holes immediately.

Compacted soils slow the penetration of water, which will tend to sit on top of the compost surface and run over the sides of the pot or down the inner edges. Once properly wetted, poor bonsai composts can hold too much water and little oxygen, which can eventually lead to problems associated with overwatering.

Extra care should be carried out when watering trees potted in poor draining compost that should then be replaced at the next repotting.

Chapter 6 Bonsai Tools

To the beginner at bonsai there would seem to be a bewildering number of tools available. However a large number of these tools are designed to aid the bonsai enthusiast who is carrying out more advanced techniques such as branch splitting, jinning or carving.

For your first attempts at bonsai, where basic maintenance is essentially all that is being practised, it is possible to use basic tools that will do the job almost as well as specialist tools. For a very basic tool kit, the following items can be used;

A pair of sharp scissors, wire cutters, secateurs (preferably the 'by-pass' not the 'anvil' type), small nail scissors for fine work and either a pointed piece of wood (chopstick) for combing out roots.

When buying your first Japanese tools, it is possible to buy items either individually or as part of small kits. Prices can vary greatly but it is recommended that you purchase the best quality tools that you can be afford. Cheap tools tend to be of Chinese origin and are often made from mild steel which deteriorate relatively quickly and can quickly lose their edge, requiring frequent sharpening. Though Japanese-made tools are dearer, they are generally made from better quality metals and can often last a lifetime.

All tools should be kept reasonably well-maintained; not only does regular sharpening increase the life of your tools, but blunt and dirty tools will not cut through wood well and tend to 'crush' rather than cut. Plant sap collects on tool-blades easily, turning them black and this can be removed with a wire brush or abrasive paper.

After many years practising bonsai, there are 6-7 tools that I would describe as essential and I could not live without. These are the tools that I will always select from my toolbox when I conduct a workshop or to work on someone's tree;

Long Handled Bonsai Scissors
Knob Cutter
Side Cutters
Jin Pliers
Wire Cutters
Draw Knife
Tool sharpener

Long Handled Bonsai Scissors

Long Handled Bonsai Scissors

This pair of long-handled scissors have lasted me 15 years of almost daily use and I find are preferable to the short-handled bonsai scissors often seen for sale. Essential for all fine and detailed shoot and leaf work. Must be kept razor sharp to ensure a fine cut and to avoid crushing new shoots.

I also carry a pair of very sharp kitchen scissors for heavier work such as cutting roots.

From left to right: Large Knob-Cutters 180mm, Small Knob-Cutter 90mm, Branch-Cutter 220mm

Side-or Branch-Cutter and Knob-Cutters

It is essential that branches are routinely removed using branch or knob-cutters. Both tools cut away the branch leaving a small indentation so that the resulting wound heals flat. Most enthusiasts use branch cutters for the majority of their branch pruning however I have always preferred to use knob-cutters partly because they are more versatile.

Of the 3 tools I have, it is the small 90mm knob-cutters I use for the majority of the time followed by the side cutters. The narrower blades of the small knob-cutters cutting through wood of any strength with ease. For branches (or trunks) thicker than 90mm, I simply make repeated cuts with the smaller blades.

Wire cutters (left) and Jin Pliers (right)

Wire cutters really are recommended as they cut cleanly through wire that is close to bark without causing any damage and the short blades make cutting the thickest bonsai wire easy. Jin pliers are designed for stripping away fibres of wood when creating a jin from a branch. However they have endless uses when working on bonsai.

Tool-sharpener (left) and Draw Knife (right)

Diamond tool sharpeners as pictured above are easy to locate in hardware stores and their small size (6mm) and rounded surface on one side makes them ideal for sharpening all bonsai tools and knob/side cutters in particular.

A draw-knife (also known as a bark-stripper) is an extremely useful tool with a multitude of uses and will strip bark away from wood in seconds.

Useful Accessories

As well as a basic tool kit, it is worth investing in some essential accessories which are frequently required for the practice of bonsai.

A cheap black turntable is a worthwhile initial investment; it allows the bonsai to be easily and repeatedly turned while being worked on.

I no longer consider cut-paste or wound sealant to be necessary and do not apply them to fresh pruning wounds when I am working although many older bonsai publications and many enthusiasts will describe its importance.

It is however important to apply Vaseline (Petroleum Jelly) to the fresh wounds of all resinous trees such as Pine, Spruce and Larch as these species will bleed heavily. Petroleum Jelly can be applied to wounds on all species and does not leave an unsightly mess, as using a traditional bonsai wound-sealant on

resinous species does.

Do not use an ordinary garden-tree wound sealant on bonsai as they can be difficult to remove once hardened, potentially causing further damage to the tree.

A repotting time soil sieves are needed to remove fine particles and dust from newly mixed bonsai soils. Root hooks are often used for removing old soil from around bonsai roots and for combing out though I would personally recommend using a mixture of hands and a chopstick, as these cause less damage when potting on new material for the first time and for repotting

Drainage Mesh is essential for stopping bonsai soils from dropping out through drainage holes in bonsai pots.

Additionally, a small knife and a small hand saw (with large teeth, fine-tooth saws will not cut through live wood effectively) are items that though not essential, are useful items to add to the toolbox.

Wire

Wire is commonly used in bonsai to allow accurate shaping and positioning of branches and trunks. It is also needed for anchoring in newly potted trees and drainage mesh.

Custom made aluminium wire is readily available from bonsai outlets and occasionally garden centres. It is worth investing in three or four different gauge wires that should be able to deal with shaping a variety of branch and trunk thickness. I would recommend purchasing 1mm, 1.5mm and 2mm gauges at first.

The Japanese traditionally use copper wire for its superior holding power though it is now becoming less popular and is harder to source commercially.

It should be noted that plastic-coated wire available from garden centres and a number of other alternatives to bonsai wire are not only unsightly, have little 'holding' power but also contain metals that can cause severe damage (sometimes with fatal consequences) to trees when they come into contact with the cambium layer, the 'living tissue' of the tree.

Anodised Aluminium Bonsai Wire.

Chapter 7 The Importance Of Timing In Bonsai

There are a wide range of techniques available to the bonsai enthusiast that can help keep his/her bonsai healthy, vigorous and in shape throughout the year. These techniques range from the straightforward but essential, such as pruning and repotting, to the more advanced such as wiring, trunk chopping or grafting. The key to using these techniques successfully is partly due to the knowledge needed to carry them out correctly, but also very importantly, when they are carried out. All bonsai techniques must be performed at the correct time for them to be successful. Failure to adhere to the correct timing can kill or injure bonsai and will greatly increase the possibility of the technique failing to have the desired outcome.

A technique such as repotting and root pruning is perfectly safe as long as the timing is correct; root pruning at the wrong time will kill or at very least, seriously weaken your tree.

Cyclic Timing

Almost all plants and certainly those that are used for bonsai have an annual or cyclic growth pattern.

In other words, over the course of one year, a plant will pass through a series of states and conditions that will not be repeated until the following year. These annual growth patterns are closely shaped and defined by the annual cycles of the sun, season and the weather. These annual growth patterns also subtly change according to your own climate and the weather experienced in your area in the previous weeks and months. (Tropical climates and indoor cultivation can and will interrupt or negate these seasonal variations making timing more difficult and in some cases, less important).

All bonsai techniques have recommended 'times' during the year that they can be performed. Dependent on the nature of the technique, the timing maybe described as any time over 3 or 4 months of the growing season to as little as a 2 week window that occurs only once a year. Unless you have full understanding of the technique, the physiological reasons for the timing and an understanding of the risks of ill-timed work, always adhere strictly to the recommended timing you are given. Never be tempted to carry out ill-timed work in the belief the tree

will be 'finished' more quickly; very often this results in a weak tree whose development time is greatly increased.

It should be added that it is important not to be tied to calendar dates when deciding when to repot, prune, wire or carry out any other bonsai technique.

The exact timing necessary depends on your national, local climate and the climate or conditions that your trees are subject to, the health of individual trees, and the actual species of tree. It is not unusual to have trees of the same species and same position in a garden that require repotting maybe a month apart!

For this reason you must learn to time your work according to the condition of an individual tree. For instance, repotting of a deciduous tree should be carried out as the new buds start to extend and not because some guy a continent away says to do it in February or March. Many bonsai books will give you a set date to try and adhere to. This is probably done to simplify timing explanations but it may well also cause problems with the health of your bonsai.

It maybe a harder way to learn and remember at first but by learning to react to your trees, your timing will be better. Instead of learning a calendar date, learn the signal that the tree will give you. Try to find sources that explain which signals in your trees to look for.

Recuperative Timing

The second form of timing that must be considered is recuperative timing. This is the amount of time a tree requires to recuperate or recover from work carried out on it.

When a tree is worked on there is a period of time where it is in a weakened state and/or it's resources are tied up in response to the work. During this time, additional work may reduce the already weakened tree to a state where it is unable to recover and either grows very slowly or even dies.

An example might be defoliating (removal of all the leaves in midsummer) and root pruning. Either of these techniques can be carried out with great success on healthy, vigorous trees. However, defoliating a tree at midsummer that has yet to recover fully from it's spring root pruning can have a devastating effect on a bonsai.

Not allowing enough recuperative time between work is a common mistake to make, particularly for beginners. Judging the time needed to recuperate depends on many factors such as the vigour of the tree species used, the individual trees health at the time of work and the nature of the actual work that is carried out.

On a general basis, the more invasive the work, the longer a period of time is required for recovery. Recovery can be counted in days for the trimming of a

vigorous tree (such as a Chinese Elm) to months for the root pruning of a weaker species or even years for trees that have been collected from the wild.

Learning how much time a tree needs in order to recover from work is difficult to generalise and comes largely with experience but is ideally learnt by studying the reaction of the tree to work and knowing when a tree is growing with renewed vigour.

A good general indicator of renewed vigour and recovery in many trees is the appearance of new shoot growth (extension) and successful hardening off of these shoots. Note that new buds and new leaves on their own are not indicative that a tree has or will recover from work that has been carried out.

Patience

A healthy nursery tree is bought during the summer and you style it immediately. Pleased with your efforts, you are unable to resist the temptation to plant it straight into a bonsai pot even though it is late Summer and your timing is wildly wrong.

The result is a tree that is too weak to respond to your styling and fails to grow for the remainder of the Summer and early Autumn, though luckily for you, it doesn't die.

The following Spring the tree starts growing, but a few branches have died back during the Winter, your styling is wrecked and the tree is still too weak to put out any new shoots. A year later, your lack of patience has resulted in a bonsai that may take another season before it actually recovers from all of your work.

With a little patience, your newly styled tree could have been allowed to recover and have been repotted just 6 months later, at the correct time, during the following Spring. This tree will have been given recuperative time after styling and repotted at its correct cyclic time. The resulting bonsai would be vigorous, suffer no dieback and be ready for further wiring and trimming within a few months. Most importantly it would be much better developed than the tree that had the ill-timed repot.

Patience is the hardest part of learning to use correct timing practises to your advantage. The temptation to plant your newly styled tree into it's first bonsai pot can be difficult to resist. However, with experience you learn that by obeying the rules of timing, the progress and development of your trees will always faster.

Chapter 8 Improving Mallsai/Mass-Produced Bonsai

Typically, beginners bonsai are purchased from garden centres, shopping malls and chain stores. Almost all originate from China and Israel and are mass produced trees that have been cultivated on large bonsai 'farms' before being lifted and planted directly into a bonsai pot. The result is a tree that is relatively cheap to buy, but will be in poor health, growing in very poor soil and with little in the way of styling other than some trimming of the tree's silhouette.

Many beginners are put off bonsai after buying such a tree. Despite being correctly positioned, fed and watered, mass-produced bonsai are often plagued by ill health. Often this is a very off-putting experience and one that causes many potential enthusiasts to be turned off bonsai permanently.

However, with a few simple steps, mass-produced mallsai can be turned into good quality, healthy bonsai.

**Mallsai is a term used by bonsai enthusiasts to describe mass produced trees typically found in malls, chain stores and garden centres around the world.*

This Chinese Elm/Ulmus parvifolia was a fairly typical mass-produced bonsai purchased 2002. The tree had many dead branches, was unstyled and difficult to water correctly. As a result of the compacted organic soil it was growing in, water would run off the soil-surface and over the edges of the pot rather than into the soil itself! Without corrective measures being taken, the health of the bonsai would continue to decline.The biggest concern I had was that the tree was still growing in the thick, airless clay from a field in China. This soil might have been adequate whilst the tree was growing in a field but once in the confines of a bonsai pot, the clay had become a solid airless mass that is very difficult for any plant to grow in. 90% of health related problems with mallsai bonsai are caused by trees trying to grow in this field-soil. Typically the soil will cause poor root growth and root rot, poor uptake of water and nutrients by the tree and difficulties with watering.

The solution is very simple, carefully wash all the clay off the roots and replant the tree into a good bonsai soil mix. Don't be deceived by the appearance

of the bonsai soil on the surface of the pot; this is simply used to cover the dreaded clay that is found beneath it!

**It should be noted that in other areas of the world, such as the USA, mallsai are often found to have a layer of rocks glued onto the surface of the soil! The purpose of these rocks is keep the tree, soil and rootball intact during transport. The glued rocks impede proper watering of the tree and must be removed at the earliest opportunity.*

Having bare-rooted and repotted the Elm into a good quality bonsai soil, the tree became healthy and vigorous and over the following three years I was able to train it, using just a few of the many bonsai techniques available to the enthusiast, into the bonsai you see above. These two images show that however humble a trees beginning, with sound horticultural care and knowledge, a mass-produced mallsai can be turned into a healthy and vigorous work of art.

Looking up into the foliage mass of the Chinese Elm bonsai

Chapter 9 An Introduction to Bonsai Soils

One of the most widely debated subjects for most bonsai enthusiasts is soil composition. Ready-mixed soils can be bought from bonsai nurseries and garden centres but these tend to be relatively expensive. Faced with repotting more than 3 or 4 trees in the Spring, most enthusiasts learn to mix their own soils. There are a large number of soil ingredients that can be used when mixing your own soil; different mixes are used by different enthusiasts with varying degrees of success. For the beginner, choosing which soil mix to use can be a daunting choice. This article is written as an introduction to Bonsai soils, it does not discuss every soil ingredient or mix that is available or possible, nor does it tell which soil mix is the 'best'. The individual enthusiast can only answer that question after experimenting over time with his own trees and care routines.

The Basic Requirements Of Bonsai Soils

A bonsai is confined to a relatively small quantity of soil throughout the year on which its very existence depends. Through the soil in the pot, the tree must be able to obtain water, nutrients and gases in order to grow. For this reason, a bonsai must be planted in a good quality bonsai soil. The quality of the soil that is used, directly affects the health and vigour of the tree. It is my experience that unhealthy trees that lack vigour are very often also planted in a poor (often organic) bonsai soil.

There are a number of qualities that are required in a good soil mix;

Good water-retention. The soil needs to be able to hold and retain sufficient quantities of water to supply moisture to the bonsai between each watering.

Good drainage. Excess water must be able to drain immediately from the pot. Soils lacking good drainage are too water retentive, lack aeration and are liable to a build up of salts.

Good aeration. The particles used in a bonsai mix should be of sufficient size to allow tiny gaps or air pockets between each particle. It is important to the health of the roots that they have access to oxygen.

A particle-based, well-structured inorganic soil allows fast drainage of water and allows fresh air to continually enter the soil. A compacted organic soil that lacks any structure, also lacks aeration and drainage and this can lead to ill-

health in the roots and tree and root rot.

Varying Soil Mixtures To Suit Different Tree Species

Though all Bonsai require free-draining, water-retentive soils, different species vary in their requirements for water and nutrients and this should be reflected in their soil composition. Pines and Junipers for instance require less water than most other species; this in turn means that they require a less water retentive soil mix. Alternatively, flowering and fruiting species have increased water requirements and tend to be planted in soil mixes with relatively high water retaining capacities. When mixing your own soil, the ratio of water-retaining material to drainage materials is varied according to the tree that it is intended for. Very often grit is used to provide additional drainage to a bonsai soil. By increasing the ratio of grit to the mix, the soil becomes increasingly free-draining; by increasing the amount of water-retentive material, the greater its water-holding capacity becomes.

Organic or Inorganic Soils

Soil mixes are described as being either organic or inorganic. Dead plant matter such as peat or leaf-litter or bark are described as being organic soil components. Inorganic soil mixes contain little to no organic matter; instead, they are made up of specially-formulated soils such as volcanic lava, calcined (baked) or fired clays. These materials are more difficult to locate than organic materials, but can be found in garden centres, bonsai nurseries, and in the case of some fired clays, supermarkets and hardware stores.

Organic Soil Mixes and Components

In past decades, Western bonsai enthusiasts tended to use organic soil mixes, using a large proportion of peat, bark and leaf-litter mixed with grit to aid with drainage. As time passed, our knowledge and understanding of bonsai in the West increased, it is now acknowledged by most enthusiasts that organic soil components such as peat are not conducive to the good health and vigour of a tree. Peat and other organic soil components have many disadvantages; they can be too water retentive, leading to the soil being continually sodden, particularly during periods of rain in Autumn, Winter and Spring. Conversely, during periods of high temperatures, dry peat can be difficult to thoroughly water, leaving dry spots inside the rootball of the bonsai. Possibly the most serious problem with organic soils is that although they may consist of appropriate sized particles when the bonsai is first planted, they continue to break down in a bonsai pot and become compacted. As the soil compacts it becomes airless and drains poorly. Such waterlogged and airless soils soon suffocate the roots and can lead to rotting roots and ill-health in a bonsai. The only organic component that I would

still recommend using as part of a bonsai soil mix is composted bark, sifted to remove any particles less than 2mm. While bark will break down slowly, it still holds its structure for a long time and until then, will not impede the air circulation or the drainage of a bonsai soil

Inorganic Soil Mixes and Components

The advantage of inorganic materials is that they hold their open structure for a long time without breaking down into mush. Inorganic materials retain a certain quantity of water and any excess is immediately flushed through the bottom of the pot; it is difficult to 'overwater' a bonsai planted in a good inorganic bonsai soil mix. Akadama is Japanese baked clay, specifically produced for bonsai and imported into the West; it is normally only available from bonsai nurseries and therefore difficult to locate. There are a number of grades of Akadama available including 'Double Redline' that is more costly but is of premium quality and less likely to break down. Akadama is the soil of choice for many Japanese bonsai Masters and enthusiasts. This is partially due to its relatively low price in Japan where it is also easily obtainable. However, while Akadama might be considered a good quality soil, in my opinion it is no better than the cheaper and more easily obtainable fired-clay soils that are produced in the West. Furthermore, Akadama can break down into a solid mush within 1 or 2 years. This old soil must therefore be washed out of the roots every one to two years. For this reason it is not recommended for species that will not tolerate regular bare-rooting (Pines for instance).Seramis/Turface/Oil-Dri/ Diatomite are fired clays are readily available in the UK and US compared to Akadama and much cheaper. Fired clays are also stronger than Akadama and thus will not break down over time. As with Akadama, fired clays can be used on their own, mixed with grit for faster draining soil or mixed with 10%-20% bark if an organic component is required for greater water retention (while still retaining good drainage properties). A wide number of fired clays are available; I would recommend contacting other enthusiasts in your vicinity for the names and availability of different baked and fired clays that you can source locally. Catlitter (also jokingly known as 'Kittydama') or Diatomaceous Earth or 'Diatomite' is a fired clay has excellent properties as a bonsai soil and I have been using this 'soil' for all of my trees for a number of years now and would not switch to anything else. It is very cheap and is easily obtainable from pet stores and supermarkets all over the UK. For more information, please visit www.bonsai4me.com

Sifting out 'Fines'

Large amounts of dust that remain in the soil mixture can clog the open

structure of the soil and disrupts the drainage of excess water. For a good soil structure that drains well, where necessary, soils are sifted to remove dust and very small particles.

Switching From Organic to Inorganic Soils

Almost all deciduous varieties will tolerate the transition from organic to inorganic soils immediately; coniferous species, in particular Pines, benefit from the retention of some of their old soil which will contain mycorrhizae fungi necessary for health.

The Best Soil Mix for Bonsai

There is no single soil mix that is best for cultivating bonsai; variables such as local climate and rainfall, personal watering regimes and individual tree species all contribute to variations in enthusiasts' soil mixes. Ultimately, experience of using different soil types and ingredients will shape your own particular preferences. It is recommended that in the first instance, find out the soil-mix that local enthusiasts are using and take it from there. I would however always recommend that an inorganic soil be always used for the health and ease of cultivation of your bonsai

'Bonsai Soils' bought from Nurseries and Garden Centres.

Though it saddens me to say this, the vast majority of products packaged and sold as 'bonsai soils' at plant nurseries, garden centres and even many bonsai nurseries are next to USELESS for bonsai. Often these are simply peat/compost based soils mixed with some sand or grit and (as described previously) have a soil structure that is too water retentive, airless and generally bad for the health of your bonsai. Though there are of course knowledgeable outlets selling good quality soil products, these appear to be in the great minority. Because you bought some ready-mixed bonsai soil from a nursery does not necessarily make it suitable for the health of your bonsai. Similarly, if you have bought a bonsai from anywhere other than a well-respected specialist bonsai nursery that will care about the quality of the trees it is selling, do not assume that the tree is planted in a good soil.

Feeding Trees Growing In Inorganic Soils

If there is one thing that seems to worry enthusiasts about switching to an inorganic soil is the lack of 'proper' organic and a 'lack of nutrients'. Firstly, I and many (most) experienced enthusiasts have switched to largely inorganic soils (such as catlitter, baked clay, akadama, turface etc etc) entirely and have been using these products for many years (I started using catlitter only 3 years ago but have been using inorganics for the past decade or more). The reason for switching to inorganics is purely for the increased health, vigour and strength

that it provides a bonsai (or any plant for that matter). Be confident that switching to inorganic soils is widely considered 'best practice'. Bonsai grown in an inorganic soil do not need any special fertilising regime or special ingredients to keep them healthy. There are of course some differences between compost-based organic mixes and inorganic mixes. Inorganic soils contain little or no nutrients, however, compost/peat based organic soils just as equally only provide very limited nutrients to a bonsai and these are quickly depleted within a bonsai pot. Organics are able to retain more nutrients better than inorganic's (after feeding) but this is not necessarily a good thing. Trees growing in inorganics need (but can also take without any danger of root burn) more fertiliser than those growing in an organic soil. Many enthusiasts see this as being advantageous though as it allows the enthusiast to feed their bonsai heavily to encourage better growth, health and faster development. That an organic bonsai soil can hold nutrients for a little longer than an inorganic bonsai soil is hardly advantageous as bonsai growing in organic soils still need to be fed regularly!

With my inorganic soil mix, I am able to feed heavily and use a slow release fertiliser and a fortnightly full strength balanced plant fertiliser simultaneously throughout the growing season.

Chapter 10 Why Repotting is Essential to Bonsai

As plants of all kinds grow, their root systems become larger and more extensive in order that they can supply their ever-expanding canopy of foliage with the necessary quantities of water and nutrients. Trees and shrubs grown in the ground can have root systems that extend beyond the shadow of their own foliage canopy in a search for water and nutrients.

On the other hand, containerised plants are limited by the size of their pot as to how far they can extend. They need to be constantly supplied with food and water on which to survive. Their root systems however, continue to grow in tandem with their leaves and branches above the surface of the soil.

After a period of time that varies between different plants and plant species, the root systems of all pot-grown plants fill their containers, and become 'pot-bound'. Under these conditions, new fine feeder roots that are so essential to the uptake of water and nutrients in a plant have little room to grow, the soil structure deteriorates and the plant starts to suffer.

With an ordinary pot-plant, the solution is to put the plant into a larger container which allows room for new, fresh soil around the rootball. With a bonsai, the aim of repotting is the same, to allow fresh soil in and around the root system so that it can continue to form fine feeder roots and so that fresh soil can be introduced around the root system. However, with bonsai, the container, and more specifically, the size of the container is not only part of the design but its size is specially selected to suit the tree. For this reason, bonsai are rootpruned.

A side effect of rootpruning is that it increases the density of the root ball. From every root that is trimmed, a number of new roots will emerge from the root-tip that was removed. As the rootball is repeatedly pruned over the years, the rootsystem becomes denser and denser. Within a well-developed rootball, dozens of fine feeder roots can occupy the same volume of soil that one unpruned root may ordinarily use. So though the size of the rootball is regularly reduced, the actual volume of root within a certain amount of soil increases, and sufficient to support the canopy of the tree.

Root pruning does not dwarf or stunt the tree in any way. The tree may lose a little vigour for around 6 weeks after rootpruning, as it regenerates its root system (this is more noticeable with evergreen tropicals such as Figs), but after this short period of adjustment, the tree becomes more vigorous than before as new feeder roots are able to develop in the new soil.

How Often Should Bonsai Be Repotted?

Bonsai need repotting when they become pot bound. A bonsai is considered to be rootbound when its roots entirely fill the pot and there are long roots circling the rootball or inside of the pot. In some cases, roots will also be seen to be growing out of the drainage holes at the base of the pot.

The time a tree takes to become rootbound varies from one year to five. A number of factors affect the amount of time a tree takes to become rootbound in its pot; different species of tree have different levels of vigour. Fast growing species and individual plants (Figs and Privet for instance) tend to require more frequent repotting and rootpruning. Other factors that contribute to regular root pruning include size of container, development of rootball (a dense established rootball will not require as frequent repotting), and the age of the tree, older trees are not as vigorous and require less frequent repotting.

The rootball should be checked for its condition annually in Spring; gently ease the tree out of its pot and examine the rootball. If the roots of the tree are still contained within the soil, the tree can be returned to the pot and repotting can be left for another year.

Chapter 11 When To Repot Your Bonsai

Bonsai cannot be repotted at any time of the year; for the majority of species, there is a small period of time during the Spring where the roots can be disturbed and pruned with reduced risk of danger to the tree's health. Though there are tree species that can be repotted at other times of the year, the purpose of this article is to describe and highlight the best time for repotting the typical deciduous bonsai in Spring. It is well known (and is frequently referred to in the Species Guides at Bonsai4me.com) that bonsai should be repotted 'when the buds start to extend', but, what exactly does this mean and exactly when does this happen? It is not possible to specify exact calendar dates for repotting. Different tree species require repotting at slightly different times and different trees of the same species can be ready to repot at slightly different times, even those grown in exactly same climate. Different climates can dramatically effect the exact date of repotting; repotting time in Florida will take place weeks before repotting in New York. However, nearly all tree species follow the same series of stages of bud growth in Spring and these can be used to identify the best time to repot your bonsai. This process should be well understood if you are planning on gifting someone these small potted trees.

Why Repot in Spring?

As temperatures slowly rise in early Spring, the roots of a bonsai slowly become active. The energy resources of the tree that have been stored in the roots over winter begin to move back up into the tree. As they do, the dormant buds on the branches (produced in late Summer and Autumn of the previous year) begin to swell.

This is the signal that the tree is beginning to come out of dormancy. As ambient temperatures continue to rise through the next weeks, move of the tree's stored energy moves from the roots, up into the tree in readiness for the explosion of new growth as the tree comes into leaf. At this point, the roots stop being an energy store and their primary function is to supply the newly opening leaves with moisture from the ground. This process can be followed from start to finish by observing the state of the buds visible on the branches on the bonsai. This process can be broken down into 4 stages;

The 4 Stages of Spring Buds

Stage One, Winter Buds: The Winter Buds on most trees are tiny and are typically colourless. At this point the roots are also dormant. The majority of the trees resources are contained within the roots.

Stage Two, Swelling Buds/Bud Swell: A period of time after the roots begin to wake in early Spring, the buds on the branches will begin to swell. In many (but not all) species, the swelling buds will have a stronger colour than those that are still dormant (Winter buds).

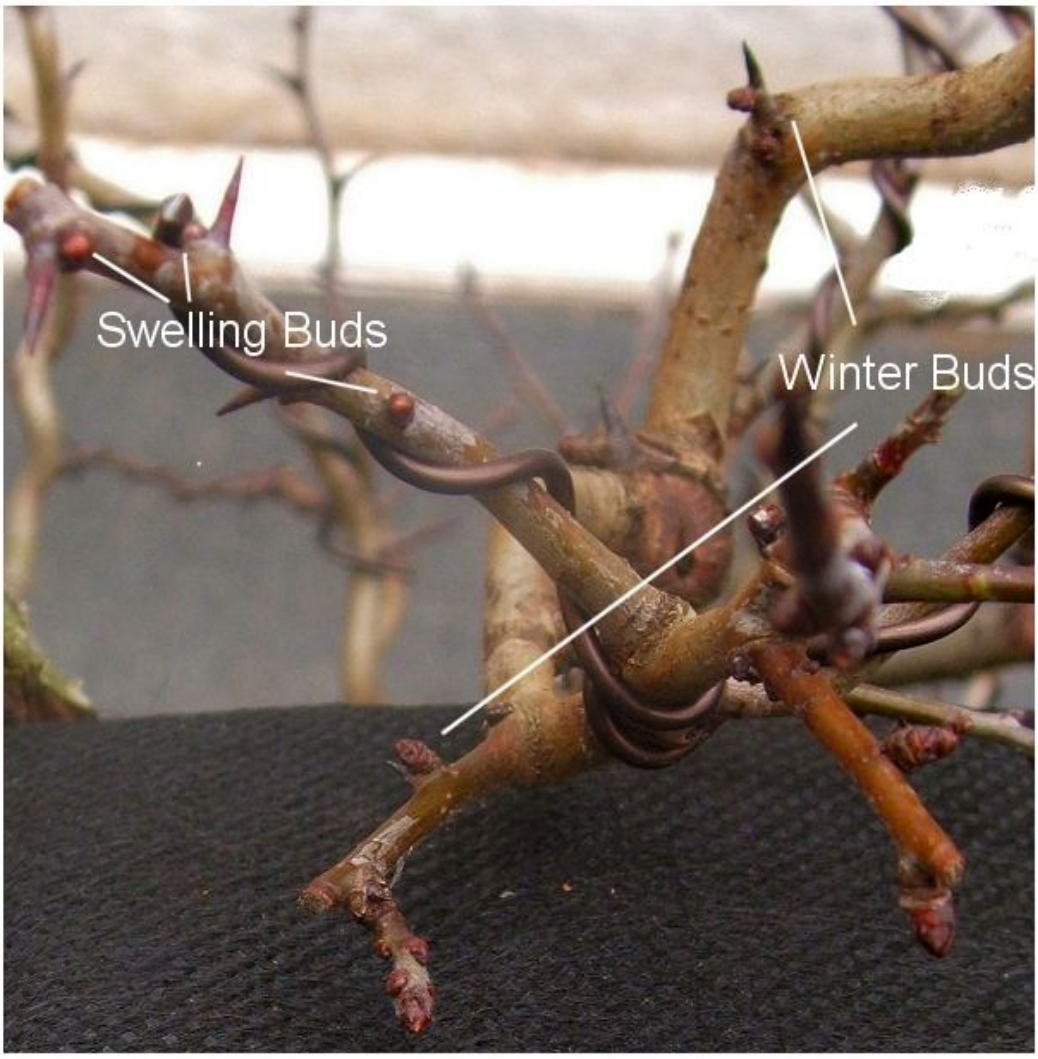
It is at this stage that new adventitious buds can appear on the trunk and existing branches of the tree.

Stage Three, Extending Buds/Bud Extension: The buds will lengthen, take a stronger colour and in many cases appear to be on the verge of opening. By this point the majority of the tree's resources are no longer in the roots but in the above ground parts of the tree.

This is the best time to repot and root prune as the roots are very active and can repair themselves rapidly, and the majority of the trees resources are contained in the tree. In other words, pruning and removal of the roots will not deplete the tree of energy.

Stage Four, Bud Burst/Bud Opening: The buds open and the tiny new leaves begin to appear. Repotting must be finished by now.

Identifying the 4 Stages



This image of part of a Hawthorn (Crataegus) was taken mid-February in the UK. The swelling buds have brighter, more colourful tips than the dormant buds.

Not all the buds on any one tree will all change from one stage to another uniformly. The tendency of most trees is that the apical buds (those on the tips of branches and in the higher areas of the tree) will always progress more quickly than buds on the inner and lower branches. This Hawthorn branch has 2 swelling buds at the tip and one bud lower down that is still dormant.

This Hawthorn now has swelling buds all over the branches and a few extending buds. These will begin to open soon and repotting must be carried out.

So During Which Bud-Stages Can a Bonsai be Repotted or Root pruned and When is the Best Time?

Stage One: Dormant Buds.

When the buds are dormant, the roots are also dormant. During this time the tree can be lifted from the ground or its current pot, bare rooted if necessary and repotted.

However, during this time, rootpruning will remove some of the stored

energy of the tree and this will affect the growth rate of the tree during the forthcoming growing season. Any damage to the roots (either accidental tears, wounds or pruning cuts) will not be repaired until the roots are more active, leaving the possibility of dieback, loss of the root or even the possibility of infection to the site.

Trees can, and are, collected and root pruned at this time with no obvious ill-effect but there are risks to the health of the tree (that increases according to the amount of the root system that is removed).

Stage Two: Swelling Buds

During this time the roots are coming out of dormancy but do not have to support any foliage and so can still be disturbed.

Repotting and rootpruning can be carried out safely. The closer the tree gets to Stage Three the better as repotting early will deprive the tree of some energy. However, those enthusiasts with large collections and with many tree trees to repot in a short period of time, will typically start early and repot trees that have many Swelling Buds.

Stage Three: Extending Buds

The very best time to repot and rootprune is as soon as extending buds are visible, typically in the upper branches of the bonsai. The roots are active and will repair any damage or pruning wounds quickly, the majority of the tree resources are above ground and the roots are not yet required to support any foliage.

Be warned; the extending buds stage can last a relatively short period of time!

Stage Four: Opening Buds

The majority of tree species must be repotted and rootpruned by this time or they should be left until the following year. As the first opening buds appear, the roots are required to supply moisture to the new foliage and should not be disturbed!

These Acer palmatum Kiyohime buds are in the Swelling Buds-Stage Two phase though the buds at the tips will begin to extend soon.

Elsewhere on the same tree, the first two opening buds are found, the tree must be repotted today or left until next year. Here it is very clear that the apical buds at the tip of the branch have progressed quicker than the other buds. It is when these apical buds begin to open that repotting should finish. Some weaker buds

on the insides of the branches will remain at Stage One or Two and not reach the stage of Extending or Opening.

Further Notes on Spring Buds and Repotting Times

It is not easy to immediately identify the different stages of Spring Buds until you are familiar with a particular species, as their appearance differs from species to species. However, the basic descriptions of a winter bud, a slightly swollen bud, a lengthening bud and an opening bud does hold throughout all species. If you observe all of the buds on any particular tree, you should be able find and compare examples of at least one or two of the 4 stages, sometimes with 3 or 4 of the stages occurring on just one branch (like that of the Kiyohime pictured above).

Repotting can be safely carried out when the buds are swollen and extending, repotting is best carried out when the buds are extending.

Repotting can be carried out when the buds are dormant but will result in a loss of vigour in the tree until it recovers the 'energy' lost from the roots. For this reason, winter repotting (repotting when the buds are still dormant) is not advised.

There are exceptions to these rules but as a fail-safe and general indicator, repotting should not be carried when the buds begin to open.

Chapter 12 A Photo-guide to Repotting

The following series of pictures illustrates the practise of root pruning and repotting bonsai. The tree in this series is a Fuchsia magellanica, a very fast growing tree that requires annual rootpruning.

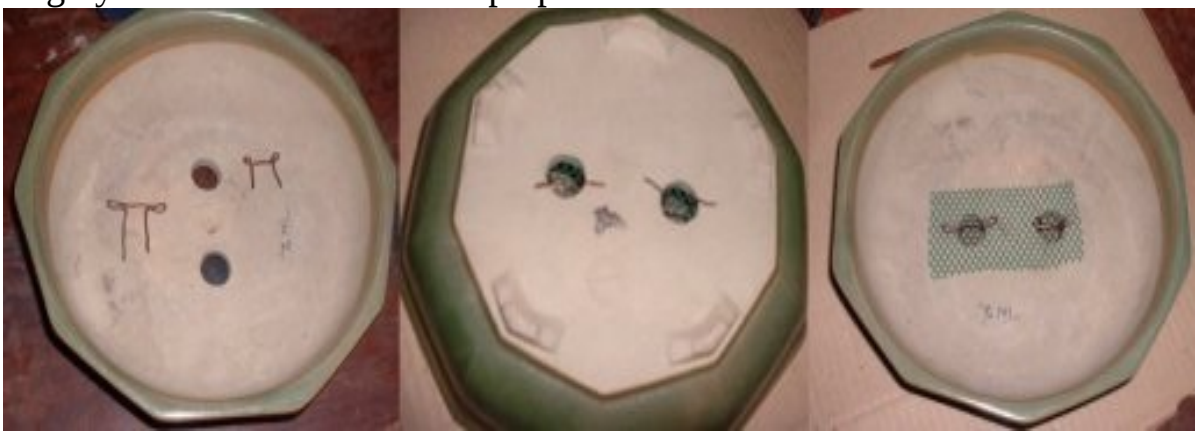
Before Removing The Bonsai From Its Current Pot

Before the process of repotting begins, it is always worth preparing the materials that will be needed, as time spent looking for materials during the course of repotting prolongs the amount of time the roots are exposed to the air.

Ensure that the following materials are to hand; sufficient good quality bonsai soil, tools, drainage mesh and wire. If a new pot is to be used for the repotting, prepare the pot.

Preparing The Pot

If a new pot is to be used, this procedure can be carried out before the tree is lifted from its old pot. If the old pot is to be retained, it will need to be thoroughly cleaned with water and prepared after the tree has been removed.



These three images show how the pot should be prepared for the tree. Plastic mesh is used to cover the drainage holes of the pot. The mesh stops the soil medium from falling through the drainage holes over the course of the following year(s). 'Butterflies' are shaped from bonsai wire to hold the plastic mesh in position.

Lengths of wire or string are then threaded through the drainage holes in a loop (not shown in this picture) to be used for anchoring the tree into position so that it cannot become dislodged within the pot. Bonsai that are not firmly anchored into their bonsai pot have a habit of being blown out of it in strong winds!

Preparing New Soil For Repotting

There are a very large number of soil mixes that are suitable for bonsai. As has been previously discussed within this book, it is essential that the soil that is used is free-draining and does not compact easily. Never use garden soils or ordinary potting compost as they are not adequate for bonsai cultivation.

Removing The Tree From Its Pot

Cut the tying-in/anchor wires from the bottom and tilt the tree out of the pot. If the tree is reluctant to come out, try tapping the sides of the pot with your hand to try to separate the soil from the edges of the pot. If this fails to work, run a sharp knife along the inner edges of the pot to release the rootball. Gently, lift the tree to inspect the rootball.

In this picture of the rootball of the Fuchsia, it is possible to see that there is no room for root growth and the root system has become pot-bound in only one growing season.

Removing The Old Soil And Combing Out

After removal of the rootball from the pot, it is now necessary to comb out the rootball. This not only removes much of the old compost but also disentangles more vigorous, longer roots that will need to be trimmed back.

Remove as much old soil from around the edges of the rootball as possible, using either a wooden stick or by hand; chopsticks are useful for this job. Metal roothooks are still used by some enthusiasts but in my opinion it is too easy to damage roots this way; roots end up being torn rather than not cleanly cut as they should be.

After the old soil mass has been removed and the new root growth has been disentangled, excess circling roots can be trimmed back with a sharp pair of scissors or shears.

The amount of root that should be removed depends on a number of variables including vigour of the tree, the density of the rootball and according to individual tree species. However as a general guideline, aim to remove around 1/3 of the overall rootmass.

The remaining root system should be carefully examined for any root

problems that may exist;

Remove any dead, decayed or injured roots to prevent or cure problems with root rot. Dead or rotted roots will be black, slimy and their outer bark will slip easily from the root itself; severely rotted roots will be entirely hollow and crumble away.

(It should be noted that Larix/Larch species naturally have roots that during their dormant period resemble a severe case of root rot, care must be taken not to remove a healthy Larch rootsystem!)

After excess circling roots have been removed; check the rootball for faults, particularly around the area of the nebari.

If the rootball has become excessively dense, make wedge shaped cuts into the remaining rootmass. This is only necessary on a well-developed, densely packed rootball and ensures that fresh soil is applied to the centre of the rootmass and that water is able to permeate. Try to encourage the development of the rootball each time the tree is repotted. The trunk should have roots spreading radially from around its base; roots that grow upwards or recurve from the base (nebari) are considered ugly. Strong, thick, downward growing roots should be removed so that the rootball is flat and can be fitted into the pot. Downward growing roots left without pruning will start to lift the tree out of the pot.

Any other thick or straight roots should also be pruned back to a point where there are fine roots branching out. Thick or straight roots tend to rob the vigour of smaller finer growth. At all times when pruning back such roots, it is important that they are inspect carefully to ensure that their removal will not reduce the rootmass to a level where it cannot support the tree. Thick roots

should be cut on a slant with the cut facing downward; this prevents water from accumulating on the cut-surface. Cut the roots cleanly with a sharp knife to help prevent rotting and accelerate healing.

Repotting

After the tree has been rootpruned, it is then necessary to place the tree back into a bonsai pot. If the pot has not already been prepared, it should be done so now.

Cover the base of the pot with a layer of soil creating a small mound where the tree is to be positioned so that when finally planted, the tree sits just above the height of the rim. Place the tree into the pot and ensure that the correct front of the tree is facing forward. Tie it in firmly with the anchorage wires so that the tree is unable to be rocked about by the wind in the coming weeks whilst new roots are growing.

Add some soil and work it around the root mass carefully so that no air pockets remain. Make sure that the soil is not compressed and take care not to damage the roots. Continue to add soil until the pot is filled just below the rim. When the soil is fully worked in, water the tree very thoroughly to ensure that the soil is fully wetted and any remaining air pockets are removed. Watering will settle the soil and it may be necessary to apply more soil to the surface. Re-water until it is certain that the soil has settled fully throughout the pot.

Finally, the tree should be held in position by the anchor wires, not by the soil.

Aftercare

Most trees will show no reaction to repotting and continue on the through Spring without any problems. Some extra care should be taken however in the six weeks after repotting to ensure the health of the tree;

Avoid exposure to severe frosts, the tree should be regarded as less hardy than normal for six weeks after repotting.

Do not place the tree where it is exposed to strong winds or sun. This is particularly necessary with evergreens as the increase in loss of moisture through the leaves as a result of the wind and sun will increase the stress on the newly pruned roots. It is possible under windy or hot conditions for evergreens to lose foliage if the reduced rootball is not able to replace evaporated moisture. If foliage does start to dry out on evergreens, provide a shady position out of the wind and mist the foliage regularly.

The Fuchsia bonsai 6 months later.
Fuchsia Magellanica / Fuchsia
Height 9"/22cm Trunk Dia 4"/10cm

Repotting a Large Privet Bonsai

Privet (Ligustrum species) have very strong, fast growing roots and this privet bonsai is no exception, requiring a regime of rootpruning every Spring to ensure its health and vigour.

Unfortunately, due to work commitments, the bonsai wasn't rootpruned during the the Spring of 2009 and by April 2010 it was badly rootbound.

Once the rootmass has fully colonized the pot of a bonsai and there is no fresh soil for new roots to grow into, both root-growth and top growth slow down considerably and the tree becomes 'stale' and slowly loses its strength..

Slow top (branch/shoot/leaf) growth can be desirable, it does after all mean that the tree requires less trimming and pruning! However, after a few years of being rootbound, a bonsai can lose its health and vigour and needs to be rejuvenated by root pruning before ill-health sets in.

During 2009, such is the vigour of the roots on Privet, the roots on my privet bonsai had begun to grow out of the drain-holes at the base of the pot in search of new space to extend into. They had grown to the extent that they formed a matt of roots underneath the pot!

So in April 2010, as the new buds began to extend, I rootpruned the tree. The bonsai was levered out of its home revealing a thick mass of roots that had colonized the bottom of the pot.

As when repotting any tree, it was necessary to prune the rootmass. As can be seen in the image above, when the bonsai is first taken out of its pot, it is impossible to see which roots require pruning and which can be left alone.

And so the roots were gently teased apart and 'combed' out with a chopstick (I find a wooden tool such as a chopstick allows you much more feedback in your fingers than metal tools do and causes far less accidental and unnecessary damage to the roots) . This can be a very time consuming job, particularly with a rootbound bonsai. There is a fine line between using enough force to pull knotted roots apart and making sure that enough care is taken not too break too many of them!

As can be seen in the image above, with the rootmass untangled, it became obvious which were the longest and therefore most vigorous roots; those that required pruning the hardest.

After rootpruning the Privet bonsai; approximately 40%-50% of the rootmass was removed in total. A Privet can and will tolerate much harder pruning but for this particular tree, root pruning 50% of the rootmass was sufficient.

The longest roots, and therefore the most vigorous, were pruned back the hardest. Roots growing underneath the trunk were pruned back much harder than those roots growing on or near the soil surface. The effects of pruning the roots in this way is to balance out the strength of the rootmass as a whole by pruning the most vigorous roots hardest and the weakest roots the least.

The repotted Privet bonsai; with a reduced rootball there was plenty of room for fresh soil to be introduced into the bonsai pot (which will encourage the roots to colonize the fresh soil) and the vigour of the tree will be maintained for at least another growing season.

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Chapter 13 Bare-rooting A Bonsai

After a number of years in a pot, all soils begin to break down and congeal. Soils that have broken down become dense and airless. The majority of the old soil is removed during the normal course of repotting, however the inner core of old soil around the base of the tree and in the centre still remains and it is important that this is removed and fresh soil introduced on a regular basis. If poor-quality or old soil is left around the centre of the rootball, it will eventually cause root rot as well as reducing the amount of healthy soil for the bonsai to root into and therefore the uptake of moisture and nutrients by the rootsystem. It would not be unusual for root rot to occur at the very centre of the rootball attacking the nebari/trunkbase whilst the exterior roots remain healthy.

If you suspect that a tree has a weak rootsystem but can see no obvious sign of ill-health around the periphery of the rootsystem; bare-root the tree and check the condition of the inside of the rootball. It is important that bonsai are completely bare-rooted to remove all old and tired soils at least every 5 years. Unless you are very certain of the soil used throughout the pot, any newly purchased trees should be bare-rooted at their first repotting. Field-grown and most collected trees/yamadori should also be bare-rooted before potting up. All mallsai are normally grown in very poor soils (particularly those bought in the UK) and should be bare-rooted during their first repotting.

One major advantage of bare-rooting a bonsai is that it is easier to study the rootball and remove unsuitably placed roots around the nebari and inspect for any damaged roots. Deciduous and broadleaf trees can be bare-rooted without any detriment to their health; more care must be taken with coniferous species such as Junipers and Pines. I would recommend removing old soil in stages, approximately a third every year,. Remove the soil by hand and never rinse the roots with water.

After bare-rooting, extra care must be taken that soil is introduced all the way around the bare rootball. Use a soil that is dry as it is easier to introduce and gently work it in and around the rootball with your fingers and a chopstick. After repotting, water the soil very thoroughly so that no air pockets remain.

Bare-rooting an Elm bonsai

This mame Chinese Elm was last repotted a year ago but has quickly become rootbound.

The excess soil around the edge of the rootball is teased away by hand or with a chopstick.

The rootball is then gently rinsed using a weak jet of water; any hard pockets of soil are carefully removed with the chopstick.

The roots are then trimmed; this tree is being planted into a slightly larger mame pot and so the roots need less trimming than normal. Attention is given to removing or trimming back thicker roots and leaving the finer roots if possible. Although not obvious in this picture, the roots underneath the rootball are also trimmed hard to encourage a shallower rootball and to encourage more lateral rooting from the nebari.

Bare-rooting a second Elm

This second Elm was last repotted a year ago into a tiny mame pot. During midsummer it was potted up into a larger mame pot (without disturbing the rootball).

After first removing the soil by hand; this tree had been planted in Akadama soil which has broken down quickly and needs to be thoroughly cleaned.

After washing the roots.

Again the roots are trimmed, this tree is to be repotted into a very shallow pot and the roots below the root pad are pruned particularly hard to produce a shallow rootball.

The two Elms repotted.

Repotting and Bare-Rooting a Collected Privet Bonsai

This example of bare-rooting concerns a far larger tree, right at the beginning of its development into a bonsai. The massive Privet/Ligustrum ovalifolium had been dug up from the ground in August 2009. Belonging to a friend of mine, the tree took two men two days to collect and was immediately planted into a makeshift wooden container measuring over a metre in length.

Estimated as having an age of at least 70-80 years, the Privet had a known history as having been planted many years previously as part of a boundary hedge in the owner's garden.

The image above shows the tree when I first saw it in person; as is typical of Privet growing in hedges, it comprised of several trunks that had grown together as they reached a height of over 2 metres in height.

As the tree had been recently collected, I knew that it was important that any superfluous top growth was removed as soon as possible.

Having studied the privet for a while, I found what I felt was the best front for the tree as a bonsai in the future and proceeded to shape the trunk by removing excess growth with an electric reciprocating saw. At this point in time, the most important aspect of the trunk to consider was its silhouette, ensuring that it had good taper with a wide base that gradually narrowed to the top.

The tree was then left to respond to being collected and heavily chopped.

By the Spring of the following year, the tree had responded well and was healthy.

However, there was one major problem with the planting as a whole; when the owner had attempted to move the tree and its wooden box to another position in his garden, its sheer weight had meant that even four men had been unable to lift it!

I decided that even though the tree had only been collected and potted up 8 months before, it would be a good idea to remove the heavy soil the tree had been planted into, and also reduce the size of the container.

While disturbance of the roots of a newly-collected tree is not advisable, Privet as a plant species are incredibly tough and the opportunity to provide the tree with an inorganic bonsai soil mix would greatly benefit it long term.

The first step of the repotting process was to unscrew the sides of the box so that I would have access to the roots.

The tree was so heavy it was still not possible to turn it on its side, even after removal of the sides of the box. So I started reducing the weight of the planting as a whole by removing the excess soil from around the edge of the rootball.

Eventually the tree was light enough to turn onto its side.

Although the tree had been planted in quite an 'open' organic mix consisting of compost and grit, the tree had not been bare-rooted. This meant that the majority of the rootball was encased in thick, heavy London ground clay (from which they make the infamous London brick!). Not only is this clay incredibly heavy, it is also an extremely difficult medium for roots to grow in, particularly in a container.

I decided that for the long-term health and vigour of the tree, the best course of action would be to bare-root the tree, removing all traces of the ground-clay and replacing it with a lightweight inorganic soil mix.

Ground-clay can become so compacted that its removal is a difficult job. Using a combination of chop sticks and my fingers (to try and avoid damaging the fine feeding roots within the rootball), I started to remove the clay from around the roots and the rootball of the Privet was revealed.

As I was able to inspect the rootball itself for the first time I was able to establish that there were many heavy roots (that would have previously grown deep into the ground) that were no longer any use to the tree and these could be removed to reduce the depth of the pot needed for the bonsai and as well as its weight.

Thick roots are only vessels through which moisture passes from the fine feeder roots into the trunk itself and removal of a thick root that carries no fine roots causes negligible harm to the health of the tree. My preference is to reduce the length of thick roots immediately after collection so that when the resulting wound has healed and issued feeder roots, additional stress is not necessary in the future when trying to fit the tree into the relatively shallow confines of a bonsai pot.

Using an electric reciprocating saw I began to shorten back the heavy roots as far as I could whilst trying to retain any existing feeder roots.

Periodically the rootball was washed with water to help remove more clay from around the rootball. Note that while it is possible to wash the roots of many deciduous/broadleaf plant species, it is not advisable with most coniferous species.

With much of the clay removed I then used a die-grinder to carve down any remaining stumps.....

.....before the much shallower rootball was given a final rinse to ensure that all traces of the clay had been removed.

Finding a lightweight container large enough for the tree was problematic until a large plastic container of exactly the right size was found in a local hardware shop!

Finally, litres of bonsai soil were carefully fed into the container ensuring that no air pockets or cavities were left in or around the rootball and then the tree was heavily watered in.

As can be seen, with a trunkbase of approx 60cm by 40cm (25"x16"), the tree was a snug fit in the new container, however it was now possible for two people to lift and carry the tree around. And with a good quality soil mix, the tree would be able to develop with added vigour.

Having heavily pruned back the thick roots, once the tree is developed enough to be ready for its first bonsai pot, it will be possible to simply transfer it into its new home!

Chapter 14 Fertilising Your Bonsai

Although Bonsai are repeatedly pruned throughout their lives to keep their small stature; they are never deprived of nutrients to stop them growing. A tree planted in the ground is able to extend its root system in search of nutrients however a tree planted in a bonsai pot is unable to do so; after a short period of time the soil in a bonsai pot loses its nutritional content as the tree consumes it, much nutrition is also lost from the effects of watering and is literally flushed out of the soil. For a bonsai tree to continue to grow strongly (if at all) the soil it grows in must have its nutritional content repeatedly replenished.

Plant Nutrients

In order to grow, trees use carbon, hydrogen and oxygen from the air, and water from the soil to manufacture their own starch and sugars. They also need from the soil a number of simple chemicals which they then use to create amino acids, proteins, vitamins and enzymes.

All organic soils have a stock of these vital chemicals; they come from the mineral part of the soil (sands/clays etc) and from dead organic matter (fallen leaves and dead plant matter). However, in the confines of a bonsai pot these vital elements are soon lost. Inorganic soils such as Japanese clays (Akadama etc) and Diatomite commonly used in bonsai soil mixes can be completely lacking in one or more of these elements even before use.

The most serious loss concerns three elements; nitrogen, phosphorous and potassium. These are known as the major plant nutrients and are required in relatively large amounts if plants are to grow satisfactorily. There are a further number of 'trace elements' that are required to be present in the soil but only in small quantities.

Nitrogen(N) is primarily used by plants for leaf growth, Phosphorous in the form of phosphates (P2O5) is primarily used by plants for root-growth, Potassium in the form of Potash (K20) for flower and fruit production.

Fertilisers

To supply your bonsai with a continual supply of essential plant nutrients it is necessary to regularly apply fertiliser. There is NO need to purchase 'bonsai feed' or any other 'special' bonsai fertiliser. Essentially ordinary plants, bonsai are more than able to cope with ordinary soluble garden fertilisers. It is far more important that a fertiliser with the correct nutritional balance is chosen.

By law, the manufacturer of a product described as a fertiliser must declare

the nitrogen, phosphates and potash content on the package. The content of most other nutrients must also be declared if they have been added to the product. When purchasing a fertiliser, look for the NPK rating on the packaging.

The first figure refers to the percentage of Nitrogen (N), the second to the percentage of phosphates (P2O5) and the third to the percentage of potash (K20).

It is important when purchasing fertilisers for the majority of bonsai that the three major elements are balanced. However it is possible to control the type of growth a plant makes by applying different fertilisers, many fertilisers available to the enthusiast are suitable; for instance to encourage flower production in bonsai, a fertiliser containing a higher proportion of Potash can be used to encourage flowering at the expense of leaf production.

When purchasing fertiliser for bonsai, ensure that all three elements are balanced and are listed as being equal (for instance 10:10:10 or 15:15:15). My personal preference when purchasing fertilisers is the Chempak series which are widely available at garden centres and DIY stores throughout the UK and America.

Applying Fertilisers

Soluble fertilisers are mixed with water and are applied to the whole of the soil surface until no more can be absorbed and surplus fertiliser runs out of the drainage holes of the pot.

It should be understood that a fertiliser with a NPK of 10:10:10 is the same as a fertiliser with a NPK of 20:20:20. It is not half as strong if mixed to the manufacturers recommended dose; but it does require twice as much fertiliser to be used to reach the recommended dosage strength. Fertilisers are produced to promote optimum levels of growth in a plant and the manufacturers recommended dosage should be followed to achieve the best NPK level available for your bonsai.

Fertiliser should ordinarily be applied every other week to bonsai or as indicated on the packaging. Do not bother to feed at 'half strength' as is often advised by bonsai texts. This is unnecessary.

High-and Low-Nitrogen Fertilisers

The essential fertiliser for bonsai is one that is balanced ; that is to say has equal balance of Nitrogen, Phosphorous and Potassium. There are two other combinations that are useful (though not absolutely essential) to successful bonsai feeding, these should be applied as an alternative to a balanced feed NOT as an additional feed.

A fertiliser high in Nitrogen (for instance 25:15:15) is often applied to many

species (particularly when in training) during the Spring, the higher proportion of Nitrogen encourages stronger leaf and shoot growth and can encourage faster growth. It should not however be fed throughout the growing season as this would eventually result in too lush green growth with long internodes.

A fertiliser low in Nitrogen is very useful when applied to bonsai from late-Summer through to dormancy. The relatively high Phosphorous and Potassium content helps to strengthen the years growth and the root system before the cold of Winter. It also increases bud production for the following year. Top growth that would otherwise succumb to the first frosts in Autumn is slowed. Ultimately a fertiliser that is rated as 0:10:10 and contains no nitrogen is preferred but can be hard to obtain and is relatively expensive. A suitable alternative is to use a low-nitrogen fertiliser (12.5:25:25) that is diluted by half.

Fertilising Lime-Hating/Ericaceous Plants

Lime-hating plants such as Enkianthus, Azaleas (Rhododendrons) and Stewartia require regular replacement feeds of specially formulated fertilisers which ensure that their soil pH remains acidic, ericaceous fertilisers also contain higher levels of chelated iron which is required by lime-hating species to offset chlorosis.

Many Pine species and Juniper species also benefit from monthly 'acid' feeds.

Suitable fertilisers include Miracid or any other fertiliser that is indicated as being specifically for ericaceous or lime-hating plants.

Solid Fertilisers

Japanese bonsai growers traditionally used solid fertilisers such as small cakes of fish-meal or rape-seed that are placed on top of the surface of the soil and these slowly release nutrients every time the tree is watered. The primary advantage of solid fertilisers is that they continually supply the tree with small amounts of nutrients and only require replacing every two to three months so are less time-consuming to apply.

There are now several solid/slow-release fertilizer-brands on the market including Green Dream and Biosorb, both of which are excellent for outdoor bonsai (they tend to leave an odour which makes their use indoors less attractive!)

Overfeeding

If the nitrogen content of the bonsai soil becomes too high it will burn the roots. Always follow the mixing and application rates described on the fertiliser packaging, never mix a higher concentration than is described and do not feed more frequently than is described. Overfeeding can result in less growth NOT

more.

Trees that are dormant or sick should not be fed as they will not consume the same level of Nitrogen and salt levels in the soil can build up if care is not taken.

It is often recommended that newly repotted trees should not be fed for at least six weeks to avoid burning new roots.

However, there is now much anecdotal advice and some scientific evidence that promotes the advantages of feeding straight after rootpruning and repotting. Immediately after root pruning, a plant will require additional nutrients to grow and repair roots, particularly phosphorous and potassium. A low nitrogen feed would be very beneficial to the plant and unlikely to burn the roots.

Do's and Don'ts of Fertilising

Do use fertilisers regularly; they are essential to the health of your bonsai and produce strong, vigorous growth.

Do use the correct NPK balance; by feeding with an incorrectly balanced fertiliser you can encourage root or flower growth at the expense of leaf and shoot growth.

Do check the requirements of individual species; different species can require different quantities of fertiliser at different times of the year.

Don't feed trees when they are not in active growth as the fertiliser level builds up unused in the compost, potentially resulting in an excessive build of salts.

Don't feed trees that are not growing due to poor health for the same reason; feeding a sick tree is unlikely to encourage it to grow and is likely to do more harm than good.

A Guide to Common Fertilisers

Before using some of the more commonly found garden fertilisers on your bonsai, it is worth considering what effect they may have on your trees, here is a list of the basic NPK ratings of some common garden fertilisers and their suitability for bonsai.

TOMATO FEEDS 6:5:9 High in potassium to encourage strong flower and fruit production at the expense of leaf growth.

LAWN FEEDS 40:10:0 Extremely high in Nitrogen to encourage very lush green top growth at the expense of anything else. Will rapidly burn root system.

BONEMEAL 4:20:0 High in phosphorous to encourage strong root growth, useful for applying to coniferous bonsai in Autumn.

FISH MEAL 6:6:0 Lacks potassium. Can be used in conjunction with other fertilisers to create solid slow-release fertiliser.

GROWMORE 7:7:7 A good balanced garden fertiliser that can be used for

bonsai but is in the form of granules which need to be left on the surface of the soil and can prove unsightly.

MIRACLE-GRO 15:30:15 Undoubtedly an excellent fertiliser for general garden use and flower production but unsuitable for bonsai use.

PHOSTROGEN 10:10:27 Suitable for flower and fruit production only.

TOPROSE 5:6:12 Encourages flower production at the expense of leaf and shoot growth.

Chapter 15 Maintenance Pruning 1- Apical Growth

Bonsai are ordinary tree species that require regular pruning to keep their diminutive shape. Without pruning, branches extend and the tree begins to lose its shape. Given enough uninterrupted growth, these branches can eventually thicken out of scale with the trunk and become coarse. Eventually, if left unpruned for long enough, a bonsai will simply revert to resembling an ordinary tree or shrub and the process of bonsai will need to be started again.

To combat this reversion and to keep its shape, a bonsai must be pinched and/or pruned on a regular basis. This is commonly referred to as 'maintenance pruning'. The period between carrying out maintenance pruning on a bonsai very much depends on the species used, the time of year and the vigour of an individual tree. Identifying whether a tree needs to be pruned though is simple, and will be discussed in the following series of articles.

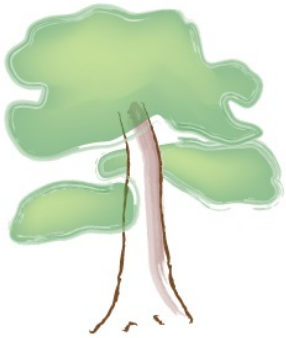
These articles are written as a guide to the maintenance pruning of 'finished' or styled trees; there are however, occasions where uninhibited growth is allowed. This is often required as 'sacrificial growth' to thicken up trunks or simply in order to form a new branch or branch structure.

Apical growth

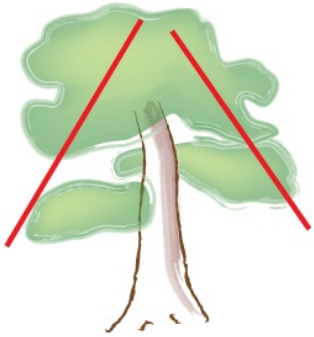
One of the key elements to understanding the pruning of bonsai is 'apical dominance'. Almost all trees and shrubs, and therefore bonsai, are apically dominant. Essentially, this means that growth is stronger near the top and outer edges of the tree. Apical dominance is a mechanism that trees have evolved to encourage extension of height and width, in order that the tree not be shaded out by neighbouring plants. It also enables a wider distribution of seed in Autumn so that their seedling offspring are not in direct competition with the parent tree for light and water.

A result of apical dominance is that foliage nearest the trunk is eventually shaded out and dies back. This inner growth is lost at the expense of the ever-extending apical growth. Normally when growing in the wild, a tree will waste little energy forming new growth on its inner branches; it will concentrate all of its resources on the tips of the branches in its continual path onwards and upwards.

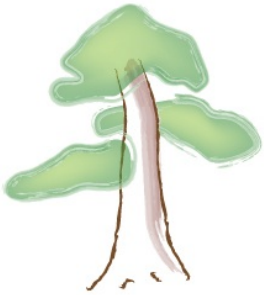
Unfortunately for bonsai enthusiasts, unless something is done to halt the apical tendency of their trees; the inner and lower branches become bare, with pads of foliage concentrated at the tips. Lower branches will lose vigour and eventually die at the expense of the more vigorous upper-branches. As importantly, a well developed bonsai will exhibit branches that are thickest at the base of the tree, with the branches becoming thinner and more refined as the eye travels up the trunk to the apex. If apical dominance is not countered, the upper branches quickly thicken up as a direct result of their vigour and become out of scale with the weaker lower branches.



Bonsai requiring pruning to balance apical-growth



The pruning required to counteract apical-growth



The outline of the bonsai after pruning

Using these 3 basic outlines of a bonsai, it is possible to see both the effects

of apical growth, also the way that pruning should be carried out to counter it. Bonsai cannot simply be pruned to the same degree on each and every branch. In the first diagram of an unpruned tree, it is possible to see that the predominant growth is around the apically-dominant areas, around the crown and outer branches. To not only re-shape to a mature form but to also counter the apical dominance, the tree is pruned harder nearer the top and sides than it is lower down the trunk. As can be seen in the second diagram, this results in pruning the tree into a roughly triangular shape.

Pruning this way means that the otherwise weaker inner and lower growth, is left with more foliage and more vigour than the now weakened apical areas. This results in a far better distribution of energy throughout the tree as well as improved form. The effects of this pruning will not last that long though; within a relatively short period of time the upper and outer areas will recover their dominance and this again will need countering.

Chapter 16 Maintenance Pruning 2- Pinching Out Deciduous Bonsai

Pinching Out Developing Buds on Broad-Leaved Species to Aid Refinement

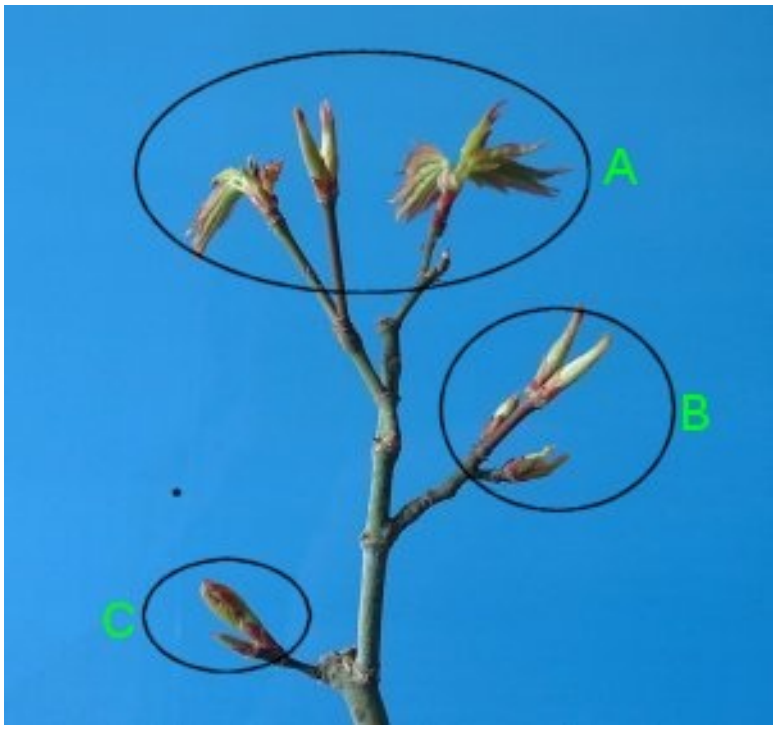
To increase refinement on bonsai that have their basic trunk and branch structure established, a technique called 'pinching out' can be used. With this technique, new growth within the vigorous areas of the tree is either partially or completely removed before it extends. After pinching out the apical growth, vigour is displaced more evenly amongst the branches of the tree. This technique encourages growth nearer the trunk and towards the lower branches.

Bud-pinching out is an important technique for keeping your established bonsai in shape. Spring growth is especially vigorous particularly around the apical areas of a tree. Apical buds that are allowed to extend uninterrupted tend to have long internodes and deprive other areas of the tree of energy. By removing them, energy is not wasted on unnecessary growth that would otherwise need to be removed in the coming weeks. It also displaces energy towards the inner and lower branches and encourages back-budding.

Pinching Out an Acer palmatum in Spring

The following series of pictures illustrates the first pinching out of an Acer Palmatum in Spring. This basic process will be repeated throughout the season on the most vigorous areas of the tree.

It should be noted that this tree is in the final stages of development and requires increased ramification of its branches. There are occasions where it is necessary to allow growth to extend on trees before pruning; this is discussed in a separate part of this article.



In this picture of an Acer palmatum branch, it is possible to see that the new leaf buds are starting to open. Contained within each bud is a new shoot with embryonic leaves that if left unpruned, will fully extend.

The apical growth which is circled in (A) is already showing signs of its dominance over the other shoots (B) and (C); the 'A' buds having already started to unfurl and extend whilst the 'B' and 'C' buds have yet to open.

If this branch is left to grow unchecked, the growth in the apical areas (A) will continue to dominate and extend throughout the season, whilst the growth in areas (B) and (C) will be weak and exhibit little extension.

In order that energy be diverted to bud-areas (B) and (C) and not wasted, the apically dominant area (A) needs to be pinched out as soon as possible.

As can be seen in the picture, the first pair of leaves are gently opened out and the new shoot is removed with the help of some tweezers or similar. The first set of leaves are left.

(NOTE; species that have alternatively-spaced leaves will have only one leaf open at this point and can be allowed to extend further to allow the retention of two leaves).

The removal of these shoots will divert energy to the buds further back along the branch, these will be allowed to extend to 3 or 4 sets of leaves before they are trimmed back.

A by-product of pinching-out is 'back budding'. Removal of the apical shoots will stimulate buds within the areas circled to develop into new shoots. This in turn will increase the number of shoots emanating from this branch, increasing ramification and helping to create a foliage pad. This process will be carried out throughout the year as new buds extend; keeping the current size and shape of the branch whilst increasing ramification.

Reducing internode distance with Spring Pinching

This technique can still be used for new shoots that are being allowed to extend to create new branches. As a bud opens into a new shoot, it will unfurl its new leaves before extending fully. By pinching-out when the required number of leaves have opened; the shoot will stop growing and extending, this results in a greatly reduced internode length.

Chapter 17 Maintenance Pruning 3- Pruning Deciduous and Coniferous Bonsai

Scissor Trimming and Finger Pruning

Bonsai must be pruned throughout the growing season to keep them in shape. Some species such as Acers have a number of growth spurts through the year, after each which they require pruning back; other species such as Junipers require almost continual maintenance pruning.

When growing bonsai, it is nearly always found that the top of the tree grows faster than the bottom due to apical dominance. One method of deciding how and when to carry out maintenance pruning is to allow new buds to extend a certain number of internodes (leaves), before pruning them back, according to their position on the tree.

Strong, vigorous growth near the top of the tree, and the outer edges of the branches is only allowed to extend 3 to 4 internodes before being pruned back to the first internode. Growth within the middle area of the tree is allowed to extend slightly further before being pruned back to the second or third internode, allowing the shoot to retain more strength. Growth on the inner and lower branches is allowed to develop still further extension before pruning back to 3 or 4 internodes.

A newly scissor-pruned bonsai, a Trident Maple/Acer buergerianum by Harry Harrington

The effect of pruning this way is to overcome the effects of apical growth, strengthening the inner and lower growth whilst holding back the upper and outer branches. This technique results in a more even spread of energy throughout the tree.

One effect of pruning harder in the apical areas than the weak, lower areas of the tree is that the bonsai retains a triangular silhouette.

As each new shoot is pruned, 2 or more new, smaller shoots emerge in its place. Repeating the process of maintenance pruning throughout the year produces increasing numbers of smaller shoots, which produce a dense 'pad' of foliage.

A developing tree that requires increased trunk or branch thickness can be allowed to extend uninhibited for a period before being pruned back. This will allow the branch to thicken and to a limited extent, the trunk, from the point where the branch emanates, downwards. If left completely unpruned however, the tree will become coarse and lose its shape.

Scissor Trimming

Trimming deciduous trees with scissors is straightforward as long as time

and care is taken. Scissors should be used to cut stems and not leaves; any kind of leaf that is cut will quickly brown off and look untidy.

Each shoot that needs pruning back should be held by its top and cut through the stem immediately above an internode/leaf.

Finger Pruning Conifers

Finger-pruning the foliage of a Juniper

The maintenance pruning of conifers such as Junipers, Cedars, Larch and Cryptomeria must be carried out by finger pruning throughout the season. If scissors are used on the foliage, the shoots turn brown and this looks ugly.

Coniferous species have foliage, which contains a 'weak point' that if utilised, can enable removal of the shoot/needle without browning off. By

utilised, can enable removal of the shoot/needle without browning off. By holding the tip of the shoot between the pads of the finger and thumb and gently pulling away, the weak point of the shoot breaks cleanly and the shoot can be pulled away.

Care must be taken not to use fingernails to apply more pressure; this will cause the foliage shoot to break at a point where browning off can occur.

As with deciduous species, this regular pruning will result in denser foliage emerging leading to the eventual creation of foliage pads.

The hardened-off shoots of Junipers can be scissor-cut.

Continually Trimming Your Bonsai

Bonsai are pruned on a regular basis so they keep their diminutive size. Without pruning, their natural apically dominant growth habit will take over; the upper and outer branches and shoots will extend strongly at the expense of the inner and lower growth, that could eventually dieback.

Without the restriction at the roots in the confines of a bonsai pot, the tree would theoretically grow to a natural height.

It is therefore important that growth is restrained. Unpruned upper branches can quickly lose their taper and delicacy, and in time, can become coarse and too thick for their position at the top of the trunk.

However, there is a balance that must be struck. A bonsai must be allowed to

However, there is a balance that must be struck. A bonsai must be allowed to grow. New growth is not only a sign of a healthy plant (and therefore a healthy bonsai) but in turn it generates a refreshing of the tree's structure, new root growth and vitality. Therefore a bonsai must be allowed periods of growth, periods of time where it is allowed to grow; enough to revitalise its energy but not so much that growth becomes coarse or the shape of the tree is completely lost and apical dominance is allowed to take over.

A bonsai that is continually trimmed without respite will be continually regenerating new buds and shoots; the repeated production of these new buds deplete the energy reserves of a tree when it is unable to recoup its lost energy levels by means of photosynthesis.

It must be realised that it is a myth to think that bonsai should and must be trimmed on a daily or weekly basis. It is also a myth to think that great bonsai look perfect all year round. Most bonsai are exhibited, photographed and displayed in perfect condition but this state is only temporary.

These same trees are allowed (or should be allowed) periods of the necessary free growth to allow shoot extension and therefore re-energise the tree; the perfect image is temporarily lost.

A balance must be struck. Free, unrestricted growth will result in the loss of refinement, shape and taper but this only happens after a certain amount of time (largely dependant on the vigour of individual tree species and individual trees). Allowing new growth does no damage to the bonsai, its shape or refinement. Any well-developed bonsai can easily be trimmed back to shape even after 3 or 4 months (or in many cases even longer) free growth, whichever tree species they are.

The practicalities of allowing free growth or not continually pruning your bonsai

It is very easy to fall into the trap of continually trimming and pinching new growth throughout the growing season; particularly for enthusiastic beginners with smaller collections. However, it is far better to get into a habit of allowing new shoots to extend before trimming back the new shoots after they have hardened off. (The shoot becomes woody).

As a fail-safe, it is worth trimming back any new vigorous shoots in the upper branches before this time to ensure that there is no over-thickening in this area but otherwise, middle and lower branches can be left to extend.

As well as keeping the tree in good health and vigour, when the new growth is finally pruned back, the branches will create new buds and shoots along the length of the branch rather than just clusters of leaves that would otherwise be prompted at the very tips of regularly trimmed branches.

During dormancy in the Winter, don't just trim the tree to your ideal

During dormancy in the Winter, don't just trim the tree to your ideal shape/silhouette. Any further growth the following year will need removing to bring the branches back to within your ideal silhouette.

Instead during the late Winter, prune the branching back hard so that the new growth can grow outwards, toward the silhouette of the tree. Again, removing the necessity to remove so much of the new, fine growth of the following season.

Knowing exactly how much new growth to allow, how hard to prune back in the Winter to allow new shoots to extend the following year and exactly how often to prune during the Spring and Summer is difficult to anticipate for the beginner and for experienced enthusiasts using an unfamiliar species. Much of this knowledge is gained from experience. However, the most important point is to understand the need for you to allow your bonsai to grow.

Chapter 18 Styling:The Basic Forms of Bonsai

The basic Japanese tree forms have evolved over the years as a way of categorising bonsai and also helping to establish basic guidelines for styling trees. These form definitions are helpful to the beginner to help develop an eye for different tree shapes and to help define different trunk and branch patterns. It is very useful for the beginner to start his or her bonsai styling education by learning these basic forms. However, once learnt, the enthusiast must not make the mistake of being bound by these definitions either.

Forms Vs Styles

In many textbooks, the following forms are described as bonsai styles, however there is a strong movement, instigated by Walter Pall, to make a distinction between the form (according to the predominant feature or direction of the trunk) and the style (the manner in which the form is displayed), and for this reason this article follows this re-categorisation by listing bonsai forms.

In summary: The form describes the basic shape of the tree as defined by trunk, the style describes the the way in which the tree has been styled (for instance windswept, near or far away from the viewer, naturalistic, classical, modern or abstract).

Bonsai Forms Described

This is a list of the basic bonsai forms but is by no means a complete list of all bonsai forms or the many variations of the different forms that exist.

Informal Upright Form

This form is the most commonly seen in Bonsai and in nature. It can be used for most tree species. The trunk can twist, turn and change direction with a number of bends along its length though the growth is basically upwards.

Branches tend to emerge from the outside of bends. Branches emerging directly from the inside of bends often look awkward. The overall silhouette of an informal upright is often irregularly triangular but does not have to be.

Coniferous species such as Pines and Junipers are often styled with largely horizontal branching and clearly defined 'clouds' of foliage.

Informal Upright Acer palmatum/Japanese Maple bonsai by Harry Harrington in early Spring

Deciduous and broadleaf species such as Elms, Maples and Box should have predominantly naturally ascending branching and should not have clearly defined foliage pads; a too-common mistake is for deciduous species to be styled with horizontal branching, clearly defined foliage pads and 'pompoms' of foliage.

Bonsai styled in this way are too-commonly seen in bonsai books and are the result of poor and over-simplified attempts at bonsai styling.

Informal upright wild English Oak. Note this does not have a triangular silhouette.

Formal Upright Form

In this form the trunk is completely straight and upright. Previously a popular form amongst enthusiasts but now much less commonly seen. The majority of upright bonsai have some movement that make them informal uprights.

Ideally the trunk should display an even taper from base to apex. This form replicates trees growing unimpeded in open growing conditions without competition from other trees. The branches leave the trunk alternatively from left to right to back and no branches face the front until the top third of the tree. All the branches will be mainly horizontal or slightly drooping as if weighed down by snow in winter. This can be a difficult form to carry out convincingly and it is recommended that only trees with a naturally straight trunk be used. The silhouette of a formal upright is triangular though not strictly symmetrical.

Deciduous species are unsuitable as formal uprights. Coniferous species such as Yew, Swamp Cypress and Cryptomeria make good candidates.

Formal Upright Form Taxodium distichum/Swamp Cypress bonsai by Harry Harrington

Broom Form

The broom form replicates the way many deciduous trees grow in nature given ideal growing conditions with no competition from other trees. It is particularly recommended for fine branching species particularly Ulmus and Zelkova but all deciduous and broadleaf tree species are suitable. The broom form is not suitable for coniferous species such as pines and junipers.

The broom form can be further divided into two types, the formal and the informal broom.

Classic Formal Broom Chinese Elm by Harry Harrington

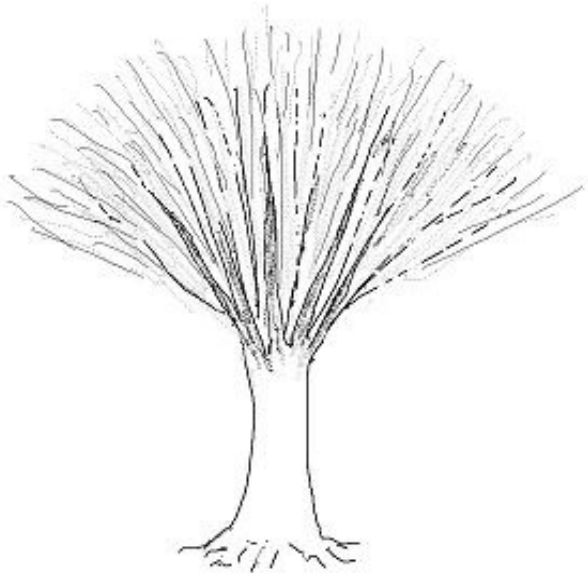
Formal Broom Form

The best known broom form has a main trunk that divides at a certain point into three or more branches of roughly equal thickness which grow out diagonally upwards from the central trunk.

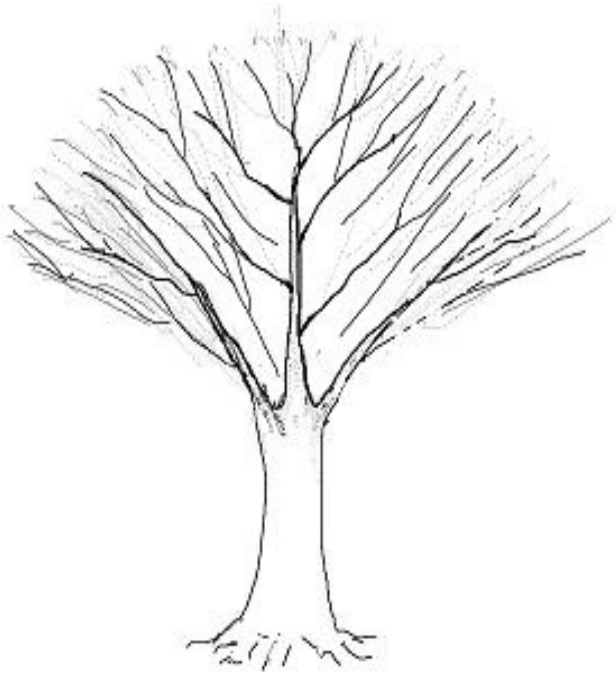
The silhouette of the tree resembles an upturned Japanese broom; hence the name.

The main trunk of the formal broom tends to be 1/3 of the overall height of the bonsai. There are no horizontal branches; all branching is placed diagonally in a fan-shape with no, or very few, crossing branches.

There are variations of the classic formal broom; there can be a main trunk that runs from base to apex of the tree. However, unlike a (in)formal upright, the branches are nearly as thick and dominant as the central trunk, but all of these branches are placed at upturned diagonals from the main trunk, forming a broom silhouette.



Classic formal broom



….....and a variation of the classic formal broom

Informal Broom Form

There is no reason why a tree without a straight trunk cannot be used for the broom form; a trunk with bends or movement is simply an informal broom. Quite possibly the most common form of broom seen in nature.

Field-growing Oak with an informal broom form

Common Hawthorn/Crataegus monogyna bonsai by Harry Harrington in the Upright Broom Form

Slanting Form

In this form the trunk itself slants as though growing toward the light or as though exposed to strong wind. The trunk can be straight or curved with branches on the sheltered side lower than their counterparts on the other side of the trunk. An important feature with this form is that the nebari or roots should appear to anchor the tree to stop it 'falling' visually. The roots on the side to which the tree leans should be short and compressed whilst the roots on the opposite side should be strong and dominant, anchoring the tree into the ground.

Field-growing English Oak with a slanting form

Slanting form Hawthorn bonsai by Harry Harrington

Windswept Form

The windswept form is one of the most difficult forms to portray as a bonsai though is often one attempted by beginners for its dramatic features.

The windswept form is also one of the most misunderstood forms. The typical windswept bonsai is styled with all of its branches on one side of the trunk flung out towards one side by some invisible force! This cliche rather spoils the form but is often repeated.

Windswept Privet by Harry Harrington

Twin Trunk Forms

In the twin-trunk form, two upright trunks emerge from the same roots and divide into two trunks at the base. Both trunks (trees) should exhibit similar shapes and characteristics having grown together in the same environment. However it is important, that one trunk should be noticeably taller, thicker and

stronger than the other as though it has received more sunlight and nutrients from the shared roots than the other trunk. Individual branches from either trunk will barely grow inwards towards the other, instead they will reach outwards towards the light and create an overall triangular silhouette. Both trees will often form a single crown.

Lonicera nitida twin-trunk bonsai by Harry Harrington

The trunks can divide higher up the trunk in a variation of the candelabra form (see below). In this type of twin trunk, a low branch has become strong and vigorous enough to become a small trunk in its own right with its own apex.

Twin Trunk variation Hawthorn by Harry Harrington

This is a difficult variation to use convincingly. There must be a noticeable difference in diameter or age of the main trunk, the sub-trunk and the branches. Thin-trunked trees are not suitable.

Multiple Trunk Forms

A multi-trunked bonsai should have three or more odd-numbered trunks growing from the same root base. All the trunks should vary in height and accordingly girth. As with a twin-trunk the branches should grow outwards into the light and create an overall triangular shape and composite crown.

Naturally occurring clump or multi-trunk form

Siberian Elm Triple-Trunk Bonsai by Harry Harrington

Acer palmatum/Japanese Maple Clump-Form bonsai photographed at the Wessex Bonsai Show 2012

Group Plantings

In this form a group of individual trees with their own rootsystems are planted together in such a way as to create a miniature wood or forest. An odd number of trees should be used in a group planting unless the group consists of over 13 or 15 trees. Group plantings are created using trees of the same species which have fairly consistently-shaped trunks of varying size and height. Though a group planting consists of many individual trees it should by styled as a whole and should create an overall irregular triangular shape.

Picea glauca var. albertiana 'Conica'/Alberta Spruce Group Planting by Harry Harrington

Larix/Larch Group Planting photographed at the Wessex Bonsai Show 2012

Raft Form

This form is also referred to as the sinuous trunk form and replicates fallen

trees whose upward pointing branches are able to grow and become a line of individual trees connected by a common rootsystem.

Essentially very similar to a group planting except for the fact that each tree is supported by the same connected rootsystem.

Cedrus/Cedar bonsai in Raft Form, styled by Harry Harrington. The 'group' comprises one tree that has been laid down in the soil and with 5 of its branches then trained upwards as trunks in a group.

Crataegus/Hawthorn raft form bonsai by Harry Harrington

Cascade Forms

This style is unusual in that the tip of the trunk is not the highest point of the

tree. The image created is one of a tree growing out of the side of a cliff with the tree cascading downwards. A cascade can have a small head of upward growth.

As the natural tendency for trees is to grow upwards it can be very difficult to encourage vigour in a bonsai that is forced to grow downwards. Cascades are often attempted by beginners for their striking shape but it is rare to see good quality full cascades.

The cascade form is split into two variants, the full cascade has a tip that falls below the bottom of its pot, the semi-cascade is broadly speaking any tree whose trunk ends between the base and the rim of the pot. The semi-cascade form also includes trees with horizontal trunks that terminate at the roughly the same height as the rim of its pot. As with slanting forms, the roots should appear to anchor the tree with bigger, stronger roots on the opposite side to the lean of the trunk.

Crataegus/Hawthorn semi-cascade bonsai by Harry Harrington

Parthenocissus quinquefolia/Virginia Creeper bonsai in the Cascade form

Root Over Rock Forms

In these forms, the bonsai is either planted directly into a hole or depression in a piece of porous rock, or it is planted over a rock with its roots growing down into a pot filled with compost. These forms replicate trees in nature that endure an existence growing in rocky, mountainous regions and have to extend their root systems over barren rock to find enough sustenance to survive.

Root Over Rock Form English Elm by Harry Harrington

Literati

Also known as the bunjin form, the Literati takes its name from an elite class of Chinese scholars who practised in the arts. Their paintings had abstract, calligraphic forms that depicted trees growing in mountainous landscapes.

Therefore these trees owe their distinctive shapes to harsh climatic conditions, they have long slender trunks that take many twists and turns and are the principal feature of the form. Bonsai in the literati form have very few branches that start very high up the trunk, often having just enough foliage to allow the tree to survive.

Literati Juniper by Harry Harrington

Candelabra Form

A tree in the candelabra form is reminiscent of an old tree in the mountains whose main trunk has died at some point in the past and a lower branch (or branches) has taken over and become a new trunk.

This form is characterised by a straight trunk that then has one or more strong upward growing branches (new trunks).

Candelabra form Juniper by Harry Harrington

Candelabra Pine photographed in Norway by NA Haagensen

This form is suitable for coniferous species often found growing near the snow-line in the mountains though it is also feasible for rugged deciduous species.

Styling: A Guide to Bonsai Styling and Critique

Within the Art of Bonsai, there are a number of rules or guidelines that are intended to help both the viewer and practitioner understand or learn what makes a good or 'bad' bonsai design. To the novice, a bonsai will be simply a tree in a pot; to the more experienced enthusiast, a good bonsai will have certain features that makes it superior.

The beginner has to understand these rules in the same way that one has to learn what makes a Leonardo de Vinci painting better than a child's.

These rules are not set in stone. They are there to help guide those new to bonsai and learning them can help the beginner begin to 'read' a bonsai rather than simply see it as a mass of leaves and branches. Most classic and many good quality bonsai will break ‘rules’; this helps to make them unique. However, *until these basic rules are learnt, understood and mastered, it is difficult to break them with success.*

General points

There should a greater mass of foliage behind the tree than in front of it to create a sense of depth.

Man-made cuts or wounds should not be visible from the front unless created as features.

The tree should be 3-dimensional, it should not appear 'flat' when viewed from the side.

The tree should not appear to lean backwards; informal forms should have an apex that leans forward.

Roots/nebari should run flat along the surface of the compost and not be raised out of the compost (excepting trees grown in a true exposed-root style).

Roots spread should reflect the form of the tree and appear to anchor the tree firmly into the compost; for trees with upright forms the roots should radiate evenly from around the base of the trunk, for slanting forms or cascades the roots should appear stronger on the opposite side of the trunk to the direction of lean.

Roots should appear to be of a roughly even size as they emanate from around the base of the trunk; inferior material will display 1 or 2 disproportionately thick roots only. However, slightly thicker, stronger roots should be located at the sides of the trunk and should not protrude towards the front.

Surface roots not be straight and should exhibit some taper and branching.

Trunk

With most forms, the trunk must taper from its thinnest point at the apex to its widest point at its base. It is preferable for the trunk to taper as gradually as possible.

The trunk must not have inverse taper; that is to say the base of the trunk should not be thinner than any other point of the trunk.

Half to two-thirds of the trunk should be visible from the front to reveal the structure of the trunk.

Trunks with any slope in any direction should also slope at ground level.

Grafted trunks should not be apparent unless inspected very closely.

Informal forms should preferably have turns or bends that diminish in size and length as the eye travels from trunk base to apex.

Trunks should be cleaned of algae and moss.

Branches

Branches normally commence around one-third to half the height of the tree.

The first branch should be the thickest with the branches thinning in diameter as they progress towards the apex.

The first branch should normally point towards the left or the right when the tree is viewed from the front.

No branch should lie directly above another.

No branch should cross another.

All branches should exhibit taper from trunk to tip.

All branches should be shaped similarly to each other and should reflect the movement (or lack of) in the trunk.

Normally, only branches in the top third of the tree should point directly forwards, towards the viewer.

No two branches should appear from the same place on the trunk (bar branches).

No two branches should appear to be at the same height.

No branches should cross the trunk as seen from the front.

Tree outline

The trees' outline is normally roughly triangular.

Depending on individual species the apex should be triangular or rounded but not pointed.

Group plantings or trees with multiple trunk forms should have an overall triangular outline, this triangular shape should not be symmetrical.

In some groups, a dominant tree can disturb the overall triangular shape.

Foliage, flowers and fruit

Dead or diseased leaves should be removed.

Leaves should not show white lime deposits from being misted or sprayed with hard tap water.

No insects or cobwebs should be visible on the tree.

All leaves should be of similar size; overlarge leaves should be removed.

All flowers or fruit should be free of blemishes.

Pots

Pots should be clean and undamaged.

The colour of the pot should not clash with the dominant colour of the tree whether that be the colour of the leaves, flowers or fruit.

Glazed pots are generally considered better for deciduous species whilst unglazed pots are generally used for coniferous trees.

Antique pots should be used for old trees, new pots should be used for younger trees.

The pot should not distract attention from the tree, it should compliment and enhance it.

Ornate pots are more suitable for flowering and fruiting trees or mame bonsai.

The tree should not be planted centrally in the pot except when a round or square pot is used.

The dominant mass of the tree should be above the centre of the pot. A tree leaning to the right should be planted left of centre so its centre of gravity is above the middle of the pot.

The tree should be planted slightly toward the back of the pot.

The tree should only be over potted for horticultural reasons; visually under potted trees look as though they have thicker trunks than over potted trees.

Compost surface

The tree should be planted proud above the surface of the compost, which should slowly fall away in height to the edges of the pot.

The surface should be kept free of weeds and debris from the tree; old leaves and flowers for instance.

The compost surface should not be plain, gravel or mosses can be used to great effect.

The use of small ceramic or wooden animals or models should be used with considerable discretion.

Multi-trunked Bonsai

There should not be an even number of stems or trunks.

Multi-trunked trees should have all their stems rising from ground level and not from part way up the trunk.

All stems should emerge from the surface of the compost closely and gradually diverge as they ascend.

All stems or trunks should have a similar form.

The thickness of individual trunks or stems should be in proportion to their heights.

Multi-tree plantings All trunks should be visible from the front and the side.

There should not be an even number of stems or trunks.

The tallest tree should be planted highest in the pot.

Space in the pot should be left to imply a natural expanse of open ground.

Trunk thickness should be reflected by trunk height.

Chapter 19 Wiring

Wiring is an important part of the process of styling your bonsai and nearly all well designed bonsai have been wired at some point in their development. Though at first a daunting technique to master, it gives the bonsai enthusiast better control and manipulation of the trunk and branches of his/her bonsai.

By coiling wire around the limbs of the bonsai, the enthusiast is able to bend the tree into a desired position upon which it is held by the wire. In a matter of weeks or months, the branch or trunk 'learns' and stays in position even after the wire is removed.

With the use of wire, straight trunks or branches can be given more realistic movement. Young branches can be wired into a horizontal or downward position to create the illusion of maturity. Foliage or branching can be moved to 'fill in' bare areas of the trees silhouette. Without wiring, the enthusiast would otherwise have to wait for shoots to grow in the desired direction. With wiring, existing growth can be manipulated there instead.

Horneam/Carpinus bonsai, new restyled by wiring each branch and repositioning them

Buying Bonsai Wire

Bonsai wire is normally only available from Bonsai Nurseries and Online Shops. It is available as anodised aluminium or annealed copper; aluminium wire is generally easier to apply for beginners and can be reused (though this is not recommended). Copper wire is more difficult to apply but has more holding

power. Once it has set into position it cannot be re-used. Wire cutters are also necessary for removing wire from branches and for cutting suitable lengths. Bonsai wire cutters are available but ordinary wire cutters are adequate if the wire can be cut at the very end of the cutters jaws.

Aluminium wire is sold in mm thickness. The thicker the wire, the stronger it's holding power. Copper wire is sold according to its gauge or sometimes mm. Typically, you will need a wire thickness a 1/3 that of the trunk or branch you are trying to bend. Copper will hold better and thinner wire can be used; aluminium the reverse. The actual size needed to bend a branch will vary according to the strength and pliability of the tree species you are wiring.

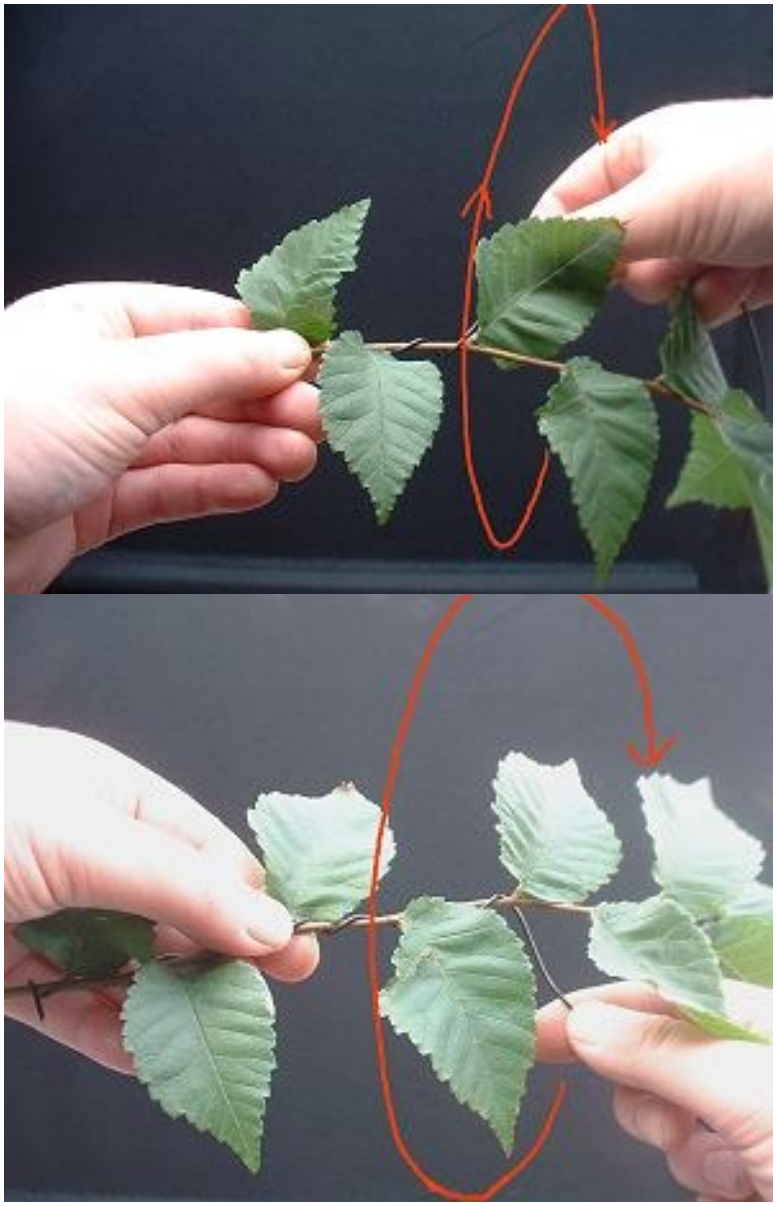
You will need 3 or 4 different thickness to fully wire a tree; try buying reels of 1mm, 1 1/2mm, 2 1/2 and 4mm to start with. As you gain experience you will be able to identify exactly which sizes you tend to use for the size and species of bonsai you are wiring.

Note that Iron and Steel are very poisonous to Junipers and some other coniferous species. Steel produces a chemical reaction with the sap causing a disease called 'black-rot' that quickly spreads through the tree causing it's death.

Wiring

The wire you use must be thick enough to bend the branch effectively and for it to remain in position but thin enough for the wired branch to be manipulated and for neatness.

The process of wiring and bending causes a series of minute splits and fractures in the layers underneath the bark of the branch; as the cambium layer repairs and heals this damage, the new position is 'learnt' by the branch. The faster the branch is growing the faster it heals, the sooner the wire can be removed without a return to its original position. Wiring a branch during the Spring or Summer when growth is vigorous can lead to deciduous branches taking to their new positions within as little as two or three weeks. Branches that are wired in Autumn or Winter can take months to fix into position. Similarly, naturally fast growing species such as Elm and Maple will require far less time to set into their desired shape than slower growing Junipers or Pines, whatever time of year they are wired.



However, it is worth reiterating that:

Where possible the wire should be applied at a 45° to the direction of the branch that is to be wired.

Hold the beginning of the wire/anchor point firmly with your left hand at all times; as you coil the wire further down the branch, you can also move the position that you secure using this hand. At all times, the wire that has already been applied should not be able to move whilst you continue to wire the remainder of the branch.

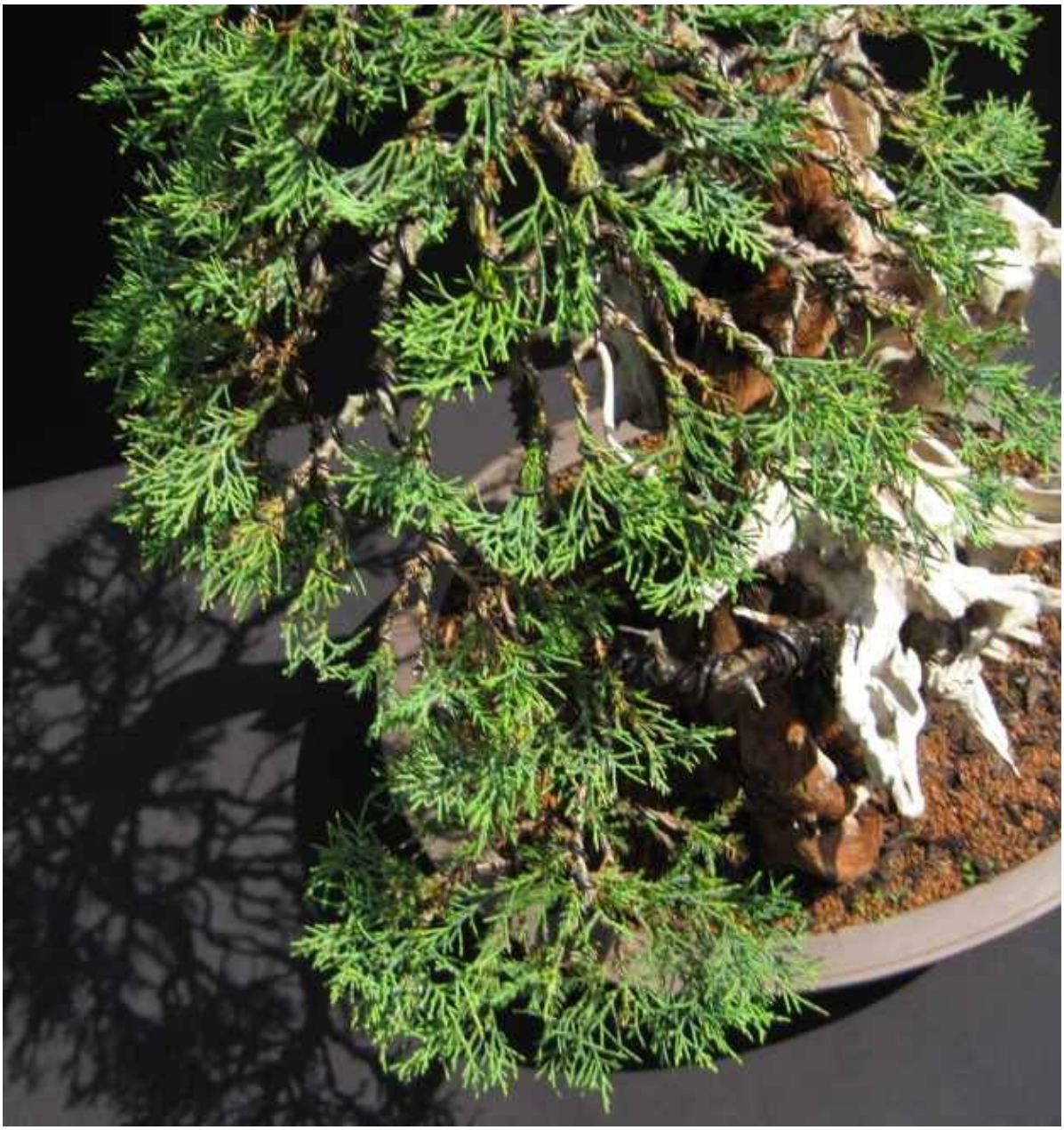
With the wire in your right hand, feed the wire through your thumb and first/index finger as you make a circling motion with your wrist around the branch, carefully work down the branch towards your body.

You can either cut a length of wire approximately 1/3 longer than the branch

you are wiring or as I prefer, you can keep the reel of wire in the palm of your hand and cut to length when you have reached the tip of the branch. Always wire from the base of the branch to the very tip.

The last turn of the wire should be at 90° to the direction of the branch to secure the end of the wire at the very tip.

On fast growing species it can be worth wiring more loosely to reduce the risk of the wire cutting in. When wiring an entire tree, always start with the trunk, wire the primary branches and then the secondary branches.



The branches of a Juniper bonsai that have been recently repositioned using coiled wire.

Bending the branches into position

· Bend branches slowly and steadily. Listen and watch for signs of the branch cracking and splitting. If it does, STOP! The thicker the branch, the more force that will be needed to bend and the less 'elastic' the wood. The branches of certain tree species are especially prone to splitting or snapping whatever their size.

· Learning which tree species have branches that are likely to snap rather than bend comes with experience. When wiring an unfamiliar species for the

first time, test the tension of the branch with your finger prior to coiling the wire.

· Some species such as Acer palmatum 'Kiyohime', Azalea, Bougainvillea or Berberis are virtually impossible to bend to any real degree without the branches splitting. These are more easily wired when branches are very young and haven't 'hardened off'.

· If possible, use your hands as a clamp holding the outside of the branch with your fingers, push and bend the branch from the inside of the curve with your thumbs. This gives firmer control whilst spreading the force of the bend around the outside of the branch where it is most likely to split.

· Bending branches at the point where they grow from the trunk can be hazardous; some species can be prone to ripping out of the trunk completely. Proceed with care.

· Allow the soil of trees to be wired to dry out slightly. With less water, the tree will be less turgid and more pliable.

· Be decisive. When a branch is bent into position do not keep returning to it and moving it, repeated bending can cause an unnecessary number of fractures in the branch, and so weakening it.

The same newly-wired Juniper, as seen from the side

Add realistic movement to your branches and trunks

· Make sharp bends at leaf joints and where secondary branches grow; this is where tree branches naturally have a change in direction. Bends made in the internodes don't look as natural.

· Add movement so that secondary/sub branches are on the outside of the bend, not the inside.

· On deciduous species in particular, make sure you add movement to all straight sections of the branch.

· Don't just create movement from left to right; make sure the branch also moves up and down as well.

Wiring does cause a degree of stress to a tree

· However if allowed time to recover without any further work being carried out, all bonsai respond well to wiring. Don't wire unhealthy or weak trees as it will delay recovery.

It is often advised that when wiring the trunk of a tree, the start of the coil is anchored into the soil and roots of the tree. Personally I dislike this technique as the anchorage is poor and the wire will often move and disturb the roots as the coil around the upper trunk is made. Unless movement is absolutely necessary in the first few inches of the trunk, I would suggest keeping the entire coil of wire above soil level.

When to wire your tree

With the large number of tree species commonly used for bonsai and the wide variation of climates in which readers will be wiring, it is impossible to state exactly when your tree should be wired. There are also pros and cons of wiring at any particular time of the year with any particular type of bonsai. Theoretically, most tree species can be wired at most times of the year though trees wired during the Winter may need frost protection in certain climates.

I am therefore listing a number of factors that should be taken into consideration when deciding at which to wire your tree;

· The only time that wiring can negatively impact the health of your tree to a large degree is during Winter, in areas where temperatures regularly drop below -10°C/approx 15°F. In temperatures this cold, any fractures that have not healed will be exposed to the cold and possible future dieback of the branch. If your tree still carries wire at this time of year, give it frost protection below -10°C.

· In warmer climates, the best time to wire deciduous trees is just as the leaves fall in Autumn. With the branches bare it is much easier to wire and adjust the branches with a complete view of the tree. The branches should heal all but the largest cracks or severe bends before the tree becomes completely

dormant for the Winter. I have been wiring my deciduous trees here in the UK (Zone 9) in the Autumn for a number of years and they have suffered no setbacks, even without frost protection.

· Deciduous trees can be wired in Spring before the leaves open but great care must be taken that the new leaf or flower buds are not dislodged.

· Deciduous and broadleaf trees can be wired any time through the growing season but when in leaf it is more difficult to study the structure of the tree and wiring around the leaves is more difficult. Branches wired at this time; particularly new shoots, will heal very quickly. On fast growing species, keep checking every few days that the wire is not beginning to dig in.

· The second best time to wire deciduous trees is at midsummer after defoliating the tree. Again with the branches bare, wiring is clear and easy; the branches should take to their new positions before the end of Autumn.

· Coniferous species can be wired at any time from Spring through to Autumn. Coniferous species will continue to heal over Winter so can still be wired in Autumn. As the wire on Coniferous species needs to be on the branches for a longer period of time; often over Winter, frost protection is needed if temperatures drop below -10°C.

· Coniferous species need wiring annually and need at least one complete wiring of the entire tree for a successful design.

· Coniferous species are best wired (particularly if heavy bends are to be made) from late midsummer through to early Autumn. By late midsummer new growth will start to need wiring and will heal faster than at most other times of the year. Many species such as Pines will have also made most of their annual increase in branch thickness by August, wiring after this time will allow the wire to stay on the tree until the following year without cutting in and scarring the bark.

· Coniferous species can be wired in the Spring and this growth will set into position relatively quickly but will need reapplying as the years new growth appears. Any wire still on the tree by midsummer should be checked regularly to avoid wire scarring; particularly on Pines that swell suddenly around this time.

· Tropical species can be wired at virtually any time of the year as they are protected from frost and have little or no dormant period. The wire can cut in fast due to the typically vigorous growth of tropical species and must be checked very often.

A large bonsai such as this can take 6 hours or more to fully wire.

Removing Bonsai Wire

As a tree grows, the branches very slowly increase in size. Any wire on the branches can become tight and as it does, mark the bark. In severe cases, the wire can cause coiling scars where the wire has bitten deep into the branch. Light marking will grow out within a year or two but heavy marking can be permanent. Wire marks are always considered ugly and should be avoided by removing the wire before it has a chance to dig into the bark.

It is always recommended that the wire be removed by cutting each turn with some wire cutters. Trying to unwind the wire can easily lead to dislodged buds, torn leaves or broken branches. However, there are many enthusiasts who do unwind their wire so it can be reused…….great care must be taken if doing so.

Don't bother unwinding copper wire as it is not possible to remove kinks from it after use. I tend to reuse heavier, more expensive gauges of aluminium wire on my trees still in training (potentsai) but have learnt to my cost that it is rarely worth trying to unwind and reuse narrow gauge wire used for thin branches. These branches are the ones that tend to get damaged!

Chapter 20 Repairing Snapped Branches

A favourite bonsai is blown off a bench during strong winds and several important branches get broken. Or, when wiring a tree, a branch is bent a little too far and snaps.

Judging by the number of questions raised on the bonsai forums over the years, these are events that have happened to all of us at least once. Very often an enthusiast has tried to repair the branch themselves and though the cambium layer repairs itself, the wound keeps reopening and is a weak point in the branch.

So how do you successfully repair a snapped branch? Or does it just need to be removed and regrown? Though I have seen many repairs and remedies offered by fellow enthusiasts (ranging from the ridiculous to the sublime) the best way of repairing a snapped branch is extraordinarily simple.

I've snapped this thin Privet branch and it shows a fairly typical scenario. As a two-year old shoot, the wood is quite brittle so it has snapped on one side while being bent into position.

If the branch is completely separated into two pieces, it cannot be repaired and should be pruned away and the wound cleaned up. However, if one side of the cambium layer (branch) is still attached naturally, it can literally be glued back together.

A spot of superglue (any brand) is put onto the surface of the wood.....

..... and the branch is glued back together. It really is as simple as that!

The superglue glues the woody parts of the branch together very tightly and supports the branch while the wound (and cambium layer) heals. Eventually both sides of the snapped branch grow together; this can take as little as 3 or 4 weeks on vigorous branches during the growing season.

I find that the repair is so strong that the branch can be manipulated (wired into position) within 5 minutes of the repair being made. The repair site will have lost its elasticity though, so do not try to create a bend at that point.

Any excess superglue will dry a white colour on the surrounding bark. It is unsightly so try to avoid using too much superglue when making your repair but any excess will fall away naturally after a few months.

Finally, always keep some superglue to hand. If you do a lot of wiring you will find it becomes a valuable tool!

Superglue is not poisonous to a tree and will not harm the tree or the branch, nor will spilt superglue damage any leaves (it just looks awful).

There is no need to wrap or protect the glued area on branches of less than

1/2", above this diameter, a thin spread of Vaseline/petroleum jelly over the damaged bark/cambium is more than sufficient.

There is no need to wire the branch or for the branch to be wired for the repair to be successful

Though superglue is not necessarily the strongest glue on the market, it is the fact that it dries very rapidly and will tolerate moisture (in the wood) that makes it so effective for repairing branches.

This technique can be used on all tree species; coniferous, deciduous or broadleaf tree during active growth or during dormancy.

Chapter 21 Propagation

One of the most satisfying ways of creating bonsai is by using plants propagated by yourself. There are many different ways of reproducing a parent plant. Deciding which technique to use is largely dependent on an individual species' suitability and also the material you have available to use. You may have a large garden tree or shrub that offers a number of possibilities for propagation or you may only have a bonsai from which you wish to create new plants without having its appearance being spoilt by the removal of too many branches. You also need to consider the length of time you wish to wait before your new plant will be ready for training as bonsai.

For a good quality bonsai, it is important to acquire a plant with a reasonably thick trunk before starting on the process of planting the tree in a bonsai pot and commencing bonsai training. The thicker the trunk of a newly propagated plant is, the less time that will need to be spent growing on before bonsai training can begin.

There are techniques for propagating that leave you with plants that will require years of growing in the ground before they become suitable as good bonsai material and there are other techniques that produce new plants that once established can be immediately trained as bonsai.

For an individual species suitability to different propagation techniques, it is important to refer to Species Guides for plants and trees. Most propagation techniques rely on tapping into a plants natural growth and reproductive characteristics and these characteristics can vary from species to species. It is also important to take note of the seasonal timing of many of these propagation techniques as most will only work at certain times of the year.

The most basic propagation techniques that can be used for creating new plants suitable for bonsai are sowing and germinating new plants from seed and by striking cuttings.

Propagating From Seed

Seed can be very easily obtained from many species of tree that can be found growing in fields, gardens and by the roadside. Many species of tree such as Oaks, Maples and Beech have instantly recognizable seed pods that once opened reveal large quantities of seed that can be used to create large numbers of new

plants.

There are also many retail outlets that sell 'bonsai seed'. It should be noted that there is no such thing as 'special seed for bonsai', bonsai are created from ordinary trees not 'special bonsai varieties'. Packets of 'bonsai seed' are generally very overpriced and can be misleading, they simply contain seeds from trees that are suitable for use as bonsai.

Some species of trees are relatively easy to grow from seed, Maple species, Black Pine, Scots Pine, Zelkovas, Beech and Larch are all species that are easy to germinate from seed. Others such as White Pine, Hornbeam and Needle Junipers can be more difficult.

Though seed is very cheap and easy to obtain, it does have some drawbacks when propagating plants. It is a very slow process; seeds can take many months to germinate, some species can take a number of seasons for their seed to germinate and many species need exacting conditions to begin the process of germination. Many types of seed require periods of cold or mild temperatures or wet weather before they will begin the process of germination.

When seeds have been successfully germinated, young seedlings will need a number of seasons of vigorous growth before they have thick enough trunks to warrant their use as bonsai. Typically, a tree grown from seed will take a further 4 or 5 years of vigorous growth to achieve a trunk just an 1" across. There are also many species of trees that readily cross pollinate and their seed will nearly always produce hybridized plants which may not display all the qualities of the parent plant.

However, growing a tree from seed and watching it mature into a bonsai is an experience that every serious enthusiast dreams about and trees that are grown from seed, from their very inception, are a reflection of their owners patience.

Germinating Seed

The ability of a seed to germinate depends on a number of factors; the quality of the seed or even whether it is still viable, the time of year, surrounding temperatures and importantly the temperature the seed has been previously exposed to, the manner of collection and storage, and importantly the matter of individual species' dormancy requirements.

It is preferable to try to use fresh seed that has ripened within the past growing season; some trees seed can have a relatively short life span compared to flower or vegetable seed and old seed may not be viable any more.

Seeds are biologically programmed to germinate in their native habitat when growing conditions are at their most favourable. For most species, this means

that seeds that are released in late Summer and Autumn, go dormant for the period of the Winter and then germinate when the soil temperatures rise in the Spring. This dormancy means that seeds don't germinate immediately in Autumn as they fall from the tree; this would result in young seedlings that would be killed by the first frosts of winter. By germinating in Spring, a young seedling has an entire season to grow and strengthen in preparation for its first winter as a young sapling.

This is a good example of why it is important to understand the need to try to imitate the natural growing conditions of an individual species to prompt it to germinate. The easiest species to germinate are nearly always those that are found locally; by virtue of the fact that these species are able to reproduce by seed also means that your local climate is favourable for germinating its seed. If a tree is able to germinate its seeds by simply dropping them onto the ground, so can you.

Unless described otherwise in the Species Guides, seed can be sown in Autumn straight into a prepared seed bed or a pot outside, the effect of repeated freezing and thawing through the winter, followed by the gentle warming of the soil and increased light in Spring will break the seeds dormancy and it should germinate. This process of breaking dormancy is known as stratification.

Stratification

Stratification can be artificially created with the help of a refrigerator. This can be necessary when trying to germinate seeds out of season, seeds that have been stored inside over winter or seeds of species that will not germinate naturally in your local climate.

Seed should be soaked in water for around 5 or 6 hours and then placed in a damp plastic bag at room temperature for 3 or 4 days. Seeds that are seen to soak when soaking in water are still viable for germination; any floating seeds are empty shells and will not germinate, these should be removed. Care should be taken with very small seed as they can all end up floating as a result of surface tension!

The plastic bag of seed is then placed in the bottom of a refrigerator where the temperature is around 4°C. The bag is then slowly moved up the shelves in the refrigerator over a period of two weeks until it is placed on the top shelf where the temperature is just above freezing. Over a second two-week period the bag of seed is then slowly moved back down to the bottom of the refrigerator. The seeds can then be removed from the refrigerator and sown.

Sowing Seed, Soil Mixes and Germination Temperatures

Seed that has been artificially stratified or seed that is being sown outside in

Autumn is best planted into a seed tray or a pot where watering and placement can be controlled more easily than if planted straight into the ground. Use a fast draining mix of organic soil, a 1:1 mix of multi-purpose compost and sand is ideal though their are also many ready-mixed seed composts available at garden centres.

Fill the seed container 1/2 to 2/3 full of compost, press it down lightly then distribute the seed evenly across the surface. Next, cover the seed with another layer of seed compost 2-3 times the thickness of the seed. Finally, cover the surface of the compost with a very thin layer of grit or sharp sand to keep the seed weighted down. Keep the compost moist at all times but never soaking wet; water very gently to avoid disturbing the soil surface and the seed.

The seed tray can either be placed outside to germinate naturally, or for seeds that are being germinated out of season or in unfavourable climates, the seed tray can be placed indoors or in a greenhouse on a windowsill that receives only a little direct sunlight.

For germination, most seeds need temperatures of between 10-15°C. Seeds from subtropical climates need temperatures between 13-18°C and seeds from tropical species require temperatures between 19-24°C.

After Germination

At first the seedlings will display two small immature leaves called cotyledons, these will nurture the seedling until it produces its first 'true' leaves at which point the seedlings can be pricked out and planted into individual pots still using a seed compost. The compost should be kept damp at all times but never allow to become too sodden as this can result in loss of the seedlings.

Do not start to feed the seedlings until 5 or 6 weeks after pricking out and fertilise very gently as the immature root system will burn very easily.

As the seedlings continue to grow into saplings they can continue to be potted on until they are large enough to be grown in the ground or used immediately for bonsai training.

Bonsai From Cuttings

Overview

Raising new plants from cuttings is one of the most reliable ways of propagating. In general, the technique involves taking a small piece of material from a living plant. After inserting into a rooting medium, the cutting is able to produce new roots and is then carefully nurtured until large enough to be potted on.

The main advantage of taking cuttings is that cuttings up to 1" thick (dependant on species) can be rooted, speeding up the process of creating a plant suitable for use as bonsai. The other advantage with cuttings is that material that is routinely pruned from bonsai and thrown away, can be used to create new plants.

There are a wide range of cuttings in general horticultural use that can be used to propagate garden plants, from leaf-cuttings to root-cuttings; for bonsai however it is stem cuttings that are normally used. There are 3 types of stem cuttings commonly used, softwood cuttings, semi-ripe and hardwood cuttings.

Most Species Guides should state the best method and the correct timing for taking cuttings from each species. This gives you an idea of how to achieve good success rates when taking cuttings, however, if material becomes available at the 'wrong time', it can still be worth trying to use it rather than throwing it away. There may be an increased failure rate but you may also gain a number of new plants.

Softwood and Greenwood Cuttings

Softwood are the soft, pliable shoots from the current seasons' growth. More often than not, they will be green-wooded. These are nearly always taken in Spring to early Summer when the new leaves on the shoot have hardened off and changed from their Spring colour.

Try to take these cuttings early in the morning if possible. Each cutting should be 8-10cm (3-4") if at all possible, trim the cutting from the host plant just below a leaf node. This is where there are likely to be adventitious buds that will hopefully root in the future. Cuttings that can be taken just below the junction of a side shoot are nearly always more successful as they have a high concentration of natural growth hormones. Trim all leaves off the lower third of the cutting and reduce leaves on the upper two-thirds to just 3-5 pairs at most.

Semi-ripe and ripewood cuttings

Semi-ripe cuttings are generally taken in mid-or late Summer; they consist of soft-tipped shoots of current seasons' growth (as with softwood cuttings) but have firm and woody growth at the base.

Ripewood cuttings consist of the same material as semi-ripe cuttings but have ripened up further and are generally taken from early Autumn to early Winter.

The cutting is taken just below a node for nodal cuttings or with a heel of mature wood for heel cuttings.

Remove all side shoots and trim nodal cuttings to 8-10cm (3-4") long if possible, trim heel cuttings to 5-7cm (2-3") long if possible. Remove leaves on

lower third of cuttings and for semi-ripe cuttings also remove soft tips. Reduce large leaves by half.

Hardwood Cuttings

Hardwood cuttings are taken in Autumn (after leaf-fall) to early Winter. They consist of the leafless shoots of fully ripe growth up to 1" in diameter. Trim to 15-23cm (6-9") if possible, with the top cut just above a bud or pair of buds and the bottom cut just below a bud or pair of buds.

Rooting Mediums

Cuttings should be dipped into rooting hormone and inserted into a seed tray or plant pot of a standard pre-mixed cutting compost or equal parts peat (or substitute) and perlite or sharp sand.

Ensure that the compost is kept damp at all times but do not allow to become too wet. Cuttings' leaves should not be allowed to touch. Watering with a fungicide solution will lessen the chances of fungi infestation.

Maintaining Cuttings

Softwood cuttings need to be placed in a propagator to ensure humidity levels are kept high and moisture loss is kept to a minimum. Alternatives include placing the cuttings container in a plastic bag or frequent misting. Softwood cuttings need to be kept at 18-24°C if at all possible. At this time of year, this usually means placing on a bright windowsill out of direct sunlight. Fallen leaves should be removed daily to avoid fungal growth which can kill cuttings. As the cuttings start to grow strongly, propagator covers or plastic bags should be removed. Softwood cuttings can start to show signs of growth within 2 or 3 weeks, they do not however root for far longer and should not be disturbed or repotted until roots start to appear at the bottom of the container. It can take as long as a year before softwood cuttings are strong enough to be potted on individually.

Semi-ripe and ripewood cuttings should also be placed in a covered propagator to ensure high humidity levels, though at this time of year (Summer or early Autumn) the container is normally placed outside where temperatures of around 21°C are ideal. Do not place in direct, hot sun which can dry out the cuttings before they are able to root. As with softwood cuttings, remove fallen leaves on a daily basis and keep the compost damp but not soaking wet. Semi-ripe and ripewood cuttings are normally strong enough to be potted on the following Spring.

Hardwood cuttings should be placed outside and do not require any cover; there are no leaves to lose moisture and humidity levels during the Autumn and Winter are naturally high. Hardwood cuttings require no more protection from

frost than their parent plants and only need extra protection when temperatures drop below -10°C. Ensure that after frosts, cuttings are re-firmed into the compost as frozen compost can lift and create air-pockets.

Hardwood cuttings will show no outward signs of growth until Spring when tiny buds will start to appear. They can be as late to start growing as May and until then should be left undisturbed. Hardwood cuttings do not generally begin to root until after their first flush of growth and unless growth is particularly vigorous should not be repotted until the following Spring; around 15months after being originally taken.

Tips For Success

If a diagonal cut is made to the bottom of cuttings, it helps to indicate which way up the cutting should be planted. The increased surface area of a diagonal cut also gives an increased area for roots to appear.

Keep humidity levels high for cuttings with leaves as this reduces moisture loss; however be wary of fungal infestations that enjoy hot, humid conditions and can kill cuttings.

Remove all dead leaves daily.

Cuttings that have dropped all foliage and have shrivelled are unlikely to strike; these become a likely source of fungal infection and should be removed.

Always use Hormone Rooting Powder; it contains fungicides and greatly increases rooting rates.

Take as many cuttings as you can fit in a pot but do not allow leaves to touch each other.

NEVER be tempted to pull out cuttings to inspect their root growth before they are ready; it is more likely that you will break very delicate roots which will result in the cuttings failure

Be Patient !!

Chapter 22 Developing Nursery Stock into Bonsai

For many years I have been using 'Progression Series' containing images of the same tree over a number of years to illustrate the effect of bonsai techniques over time. This short progression series is intended to show the importance of pruning back nursery stock/garden centre material hard if it is to be used for bonsai.

Many beginners enjoy purchasing and then styling nursery stock into bonsai. However, very often the enthusiast will find it difficult to prune a newly acquired plant sufficiently hard enough, resulting in a spindly looking bonsai with a weak-looking trunk.

December 2006: This Euonymous alatus/Winged Spindle or Burning Bush was purchased at a local Garden Centre Sale for just £10GBP. This is quite a typical purchase that one can make from Nurseries and is often made by enthusiasts with the intention of using the stock to make a bonsai.

Here the tree can be seen just after purchase; it is approximately 24"/59cm

tall having already been reduced in height by half at the Garden Centre.

The trunkbase is approximately 1.5"/3.5cm thick and looks very thin when compared to the rest of the tree. Ideally to make the trunk look appropriate for a bonsai, I will need to aim for a finished tree height of between 6 and 10 times the diameter of the trunk. As Euonymous is naturally quite a thin-trunked tree in the wild, I will aim for a height 10 times the diameter of the trunk; in this case 15" or 37cm.

So I start pruning; I need to reduce this tree down to a little less than the final height (this will allow room for me to grow a new canopy/apex in the future)

By the time I have reduced the tree's height down to 12"/29cm there is not much left. Notice that I have also chosen trunklines that taper as much as possible so that the trunklines are as thin near the top.

A composite of the before and after images: now it is time to simply wait for the tree to react in Spring by popping new buds all over the trunk and growing out new branches from the resulting shoots.

August 2007: After strong growth in Spring and Summer, the tree is pruned back hard again. This process of allowing the tree to grow strongly and then to be pruned back hard is repeated to help build up ramification and density of the branches.

January 2008: 18 months later and the tree has had the growth of 2007

pruned back and styled. Notice that I have also pruned back the trunks as new buds and shoots became available for me to prune to.

July 2008: As each month of growth passes, the tree slowly but steadily fills out.

April 2009: The tree has been repotted into a simple round mica pot and has opened its fresh green Spring leaves.

As can be seen in these last images, despite its relatively thin diameter, the

trunks now looks powerful and in proportion with the new branches. This could only be achieved by properly pruning the tree when it was originally purchased and regrowing new branches.

The current height of the tree (slightly taller than originally intended): 16"/39cm

Chapter 23 A Basic Guide to Pests and Diseases That Affect Bonsai

Most species of shrubs or trees commonly used for bonsai cultivation rarely succumb to disease if looked after carefully and given the correct environment to grow in.

It is my experience that 95% or more trees that are affected by disease or bugs are also in poor general health. Under or over watering, under or over feeding, poor growing conditions (including poor, compacted soil), poor positioning of the bonsai, all cause stress to a tree, leaving it more susceptible to infection from disease and bugs. Bugs can attack trees randomly though you quickly learn which are likely to become infested at a moments' notice! Whilst healthy, vigorous trees are unlikely to be attacked, they will also be better able to survive attacks from bugs and diseases. Trees in poor health or trees that are under stressful growing conditions will be more affected by any external attack on its weakened defences.

Precautions such as regular spraying with systemic insecticides and fungicides can be useful though should be relied upon. Systemic remedies work by being sprayed onto the foliage, which digests the treatment into the sap stream of the plant where it is distributed throughout the entire plant. Attacks of fungi or bugs are quelled when they attack the plant and are exposed to the treated sap. However, systemic treatments are not 100% effective and regular spraying is expensive, environmentally unsound; repeated use can also reduce the effectiveness of treatments when they are actually needed. In my opinion, it is far better to use systemic insecticides or fungicides on trees that are known to suffer problems at certain times of the year.

Primarily, try to identify what has happened to your tree. Has it lost foliage? Do any of the leaves have discolouration or holes? Closely examine the tree and the foliage, is there any evidence of pests either on the tree itself, on the surface of the compost or around the surface on which the pot itself is standing. Secondly, once (hopefully) the pest or disease is identified and dealt with it is important to identify if there is any way that you could prevent re-occurrence in the future. Some problems such as caterpillars and aphids are difficult to guard

against though you should be able to anticipate which trees in your collection are more likely to be attacked.

Yellowing Leaves/Dropping Leaves

There are only 3 ways that a healthy tree with healthy foliage will suddenly lose leaves or have leaves that suddenly turn dry and crispy (over just 2 or 3 days):

Frost, a tropical and subtropical species being exposed to frost

Poison, the bonsai is exposed to a poisonous chemical either in the soil or the air (directly onto the foliage). Though very rare, it isn't unknown for a tree to be badly affected when accidentally exposed to drifting spray from weedkiller use.

Underwatering is by far the most common reason for the sudden drying up and death of healthy foliage. Once there is no moisture left in the soil of the bonsai, the leaves will die within hours. Was the soil allowed to dry out completely? Was the soil watered thoroughly enough the last time the tree required water? Was the soil dry but looked wet because you misted the tree and the surface of the soil? Less severe under watering can also lead to yellowing of the leaves; see below.

Yellowing leaves and/or dropping leaves can occur for a number of different reasons;

Chlorosis is caused by a mineral deficiency and is due to a lack of magnesium, manganese or iron. It usually only affects acid-loving species such as Azaleas. Administer a liquid fertiliser that contains trace mineral elements easily available at all garden centres. Acid-loving species such as Azaleas can (and should) be fed Miracid, which contains easily absorbed sequestered iron on a routine basis.

Dieback and yellowing leaves nearly always end up dying and falling off the tree unless the cause is Chlorosis, this is likely to be dieback of the foliage. Dieback of large areas of the tree can occur when a tree is traumatised for some reason and the tree responds by dropping any foliage that is not required for its survival. The cause is often due to damage to the rootsystem by rootrot through overwatering or lack of watering which has allowed the root system to dry out. Some species (particularly tropical indoor varieties) can also become stressed by moving a tree to a new position, and they will loose their foliage. (See sections on rootrot and underwatering.)

Natural wastage some trees such as Pyracantha/Firethorn and Ulmus/Elms will develop new growth from leaf axils and will then naturally discard the now redundant leaf. Check to see if new growth is appearing from the point of leaf

loss. Evergreen trees will have periods each year where they drop old foliage as it is replaced by new. If leaves are yellowing and dropping from old inner areas, this is likely to be the case. However to ensure that this growth is replaced, make sure that light and energy are given to old, inner areas of the tree by pruning the apical growth. Similarly, deciduous varieties that are left unpruned will shed inner growth at the expense of new growth at the ends of the branches.

Visible Pests on Leaves, Bark or Roots

If there are visible pests on the leaves, identify them and take the appropriate action;

Black Fly and Greenfly are both common forms of aphids. They suck sap from the tree and in large numbers can cause dieback of new or unripe growth. On trees in poor health, this can eventually lead to death if not dealt with. Aphids can also carry virus diseases from one plant to another.

Trees are normally attacked by a few aphids, which within a few days can multiply to very large numbers. Fortunately, once detected, aphids are easily dealt with. Small numbers of aphids and their eggs can be dealt with by rubbing them off with fingers. Larger infestations can be quickly killed off by using one of any number of insecticide sprays. Soapy water can also be used if sprayed onto infested areas.

Some trees such as Acers are particularly susceptible to aphid infestation and systemic insecticide use might be worth considering during periods of repeat attack. It should be noted that the presence of ants should be looked for on trees, which are repeatedly infested by aphids. Ants will commonly carry aphid eggs into trees, protect them from predators and milk them of their sticky, sweet excretion called honeydew. If ants are spotted, they should also be dealt with!

Caterpillars are very destructive to leaves and young growth leaving holes in leaves and in some cases completely stripping them altogether. Often very difficult to spot through excellent camouflage, close inspection of leaves, stems and in particular the underside of foliage is required to find and remove them by hand. Immature caterpillars will often be spotted in leaves that are folded over to protect them from predators. Contact insecticides are rarely affective though repeated problems can be reduced by using systemic insecticides.

Slugs and snails are also very destructive and quickly cause large areas of defoliation. During periods of warm, damp evenings they are particularly prevalent causing holes around the edges of leaves, this can be so extensive as to completely strip all leaf from its stem. The most common tell-tale sign of slugs or snails is the silvery trail that they leave behind them. Slugs and snails are only

active when temperatures reach 10°C in the Spring and can be picked off by hand at night time (!) or killed by using proprietary slug bait in the form of pellets or liquid solution.

Cuckoo spit is evident by globules of white froth on the surface of leaves and stems. Inside the froth are larvae known as froghoppers, these feed on the sap of plants in the same way as aphids do, causing dieback and distortion of growth. Cuckoo spit can be removed by hand and by insecticide.

Vine weevils are probably the worst enemy of bonsai! Unlikely to be actually seen on the plant, their presence can be determined by irregular notches taken out around the edge and centre of leaves. Far more destructive to bonsai are the larvae of vine weevil, which feed on the root system commonly causing the eventual death to the plant. Adult vine weevil are 8-10mm in length, black with white/yellow markings running the length of their bodies. Vine weevils are unable to fly but are excellent climbers and can occasionally be seen on the underside of infected plants. Adult vine weevils are easiest removed from affected plants by shaking or brushing the foliage from which grazing adults will be dislodged. Vine weevil grubs are approx. 10mm in length, white with a red ‘head’. They feed on the roots of plants over winter and by early Spring pupate into adult vine weevils which are all female and can go on to lay up to 1,000 eggs over the course of the year. Vine weevil eggs are spherical, brown and less than 1mm in diameter - they should not be confused with slow-release fertiliser pellets used by nurseries which are larger in size. Larvae that hatch in the warm summer months can become adults by autumn. The presence of larvae is most frequently discovered when repotting in Spring or when trees suddenly die from a lack of roots! Vine weevil grubs can only be dealt with at present by removal by hand or by a small number of proprietary chemicals on the market. Most effective is "Bio Provado Vine Weevil Killer" which is used as a soil drench protecting the foliage against adult vine weevil attack for a month and vine weevil larvae attack for 6 months.

Scale insects are sap sucking insects that attach themselves to the bark of bonsai and cover themselves in a protective shell brown shell. These are best removed by handpicking, as contact insecticides are unable to bypass the protective covering.

Red spider mites are very tiny sap-sucking insects that attack trees (especially coniferous plants) in hot, dry periods. The mites are hard to see with the naked eye but their presence can be detected by fine webbing around the foliage. Contact insecticides are effective against affected trees and regular misting of foliage in hot, dry weather will deter infestation.

Fungus Gnat/Scarid Fly are tiny flies that can be seen flying around trees that

are kept indoors. The flies themselves are no more than an irritation, however their grubs feed on the root system of the bonsai. Fungus Gnats are drawn to overly wet soils, particularly if they contain moss. Though the Gnats are simple to kill with the use of insecticides or household fly sprays; it is also important to improve the condition and drainage of the soil as well as ensuring that the soil is not kept permanently wet.

Viruses and Fungi

Viruses are most commonly detected by the presence of leaves or flowers that are distorted or discoloured, growth can be stunted abnormally and the plant can dieback. Treatment should include removal of all infected growth. Plants suffering with a virus should not be grouped together with other plants of the same Genus as to avoid cross-contamination and tools should be sterilised after use. Mildew, rust and black spot are all common to weak and stressed trees. If a tree is affected by these diseases it is important to try and discover the cause of the underlying weakness in the bonsai itself.

Mildew is a fungi that thrives in damp, poorly ventilated conditions causing the presence of a white mould to form on foliage. The fungi extract sap from the host plant causing loss of vigour, distorted growth and dieback. The fungus overwinters in buds so that young foliage emerges in Spring already infected. Spores are produced that can be spread to healthy foliage via water; hence mildews can spread quickly during warm, rainy periods. Confusingly though, whilst water droplets can aid the dispersal of the mildew spores, water stress brought on by lack of water to the root system in hot weather, reduces the natural resistance of the tree to infection.Once affected, it is not possible to rid a leaf of mildew. Infected shoots and leaves should be removed as soon as possible and healthy foliage should be sprayed with fungicide to prevent further infection.

Rusts are fungal diseases that cause raised, brown or orange areas to develop on the underside of leaves (which can sometimes be seen from above the leaf) particularly on Beech and Birch species. Rust is not only unsightly but causes loss of vigour to the plant. As with Mildew, Rust is dealt with by removing affected leaves and applying fungicide, again, good air circulation will help trees avoid infection.

Black Spot on Chinese Elms can be prone to developing clusters of black spots less than 1mm in diameter on the surface of their leaves. The foliage then goes on to yellow and drop. This is caused by a virus known as Black Spot. As with mildews and rusts, once a leaf is found to be infected, it must be removed to halt the spread of the disease. Care should be taken not to spray the foliage as

water helps the spores travel around the plant. Avoid standing the tree in persistent rain. The remaining, healthy foliage should be sprayed with fungicide.

Chapter 24 Species Guides

Buxus/Boxwood Bonsai

Buxus is a genus of about 70 species of evergreen shrubs and occasionally small trees found in habitats ranging from rocky hills to woodland in Europe, Asia, Africa and Central America. The leaves of many Buxus species are very small which is an ideal attribute for bonsai. In Spring, Buxus display a show of male flowers with conspicuous yellow anthers that surround single female flowers.

The two Buxus species that are commonly seen as Bonsai are Buxus microphylla/Japanese Box and Buxus sempervirens/Common Box. Outwardly both of these species are very similar, carrying elliptic, glossy, dark-green leaves to 2-3cm long. The main difference between B. sempervirens and B. microphylla is their vigour; B. sempervirens can reach eventual heights of 5 metres with a spread of 5metres, B. microphylla on the other hand is very slow growing, only reaching an overall height of around 75cm with a 1.5 metre spread.

There are a large number of varieties of both species available at nurseries though variegated varieties should be used with care as they are less suitable aesthetically.

Bonsai Cultivation Notes

Position Sun or light shade. Excessive sunlight can result in sun-scorched leaves. Both species are hardy to -4°C but frosts and cold winds can discolour top growth. Give additional protection to trees when temperatures drop below -5°C Box is regarded by some as suitable for indoor cultivation during the Winter and should be placed in an unheated room with good light. Ensure good air-circulation around the tree to avoid fungal diseases.

Feeding Every two weeks throughout the growing season.

Repotting Every 2 to 3 years in Spring as new leaf buds start to extend. Use a basic soil mix. Trees that are rootbound will grow very slowly indeed but with repotting will regain vigour.

Pruning New growth needs to be continually trimmed to shape throughout the growing season. The natural habit of Buxus species is very angular and stiff, Buxus bonsai should be pruned and styled in a way that softens their form. Buxus are a broad-leaved species that suit deadwood styles and small amounts of

jinning.
Propagation Root semi-ripe cuttings in Summer. Division in early Spring. Airlayering in late-Spring.
Pests and Diseases Red spider mite can be a problem in hot weather.
Box Blight is a fungal disease that has seriously affected many mature box plants in gardens across much of Europe in the past 4 or 5 years. Thought to be a 'new' disease and as yet has not be clearly identified. Box Blight infects the leaves causing spots that lead to rapid defoliation, it quickly moves into the stem tissue killing off smaller branches. Over a few weeks, black streaks appear on the bark and a grey-ish fungus may be seen under the remaining leaves. Within two or three months of infection the entire plant can die.
Box Blight is not only extremely virulent, it is capable of defoliating very mature plants in a matter of weeks. There is currently no available chemical remedies for this disease. Diseased branches affected by blight should be pruned off at once. To avoid spreading the disease to other Buxus plants, bin or burn infected branches, clean tools with meths, position affected trees in isolation and try to avoid contact with affected plants in damp weather.
Styling Informal upright forms with single or multiple trunks in all sizes.

Ficus/Fig Bonsai

One of the most popular trees for indoor bonsai, the Ficus genus consists of over 800 different species of evergreen trees, shrubs and woody climbers usually found in moist forests in tropical and subtropical areas of the world. Of these there are at least a dozen species and hundreds of varieties that are suitable for bonsai cultivation.
As plants from subtropical and tropical areas, Figs are not frost hardy and need to be grown indoors when day or night temperatures are lower than 15°C; for much of Northern Europe this means that outside placement is only possible during June and July. Figs suitability for indoor growth is largely due to its tolerance of poor humidity levels and poor light levels that prevail in our centrally-heated homes. This tolerance to poor light is largely due to the native habitat of many Figs on the forest floor, shaded by the forest canopy above. Figs are able to tolerate poor humidity levels and dry air with their thick waxy leaves. It should be noted that although Figs will grow well in poor conditions; the better the humidity and light levels are, the more vigorous the plant is. Ficus bonsai should be given as much light as possible to encourage strong growth.
Ficus Species Suitable For Bonsai

The following is a list of commonly used species; there are also large numbers of varieties of these species available and the suitability of these should be determined primarily by leaf size.

Ficus salicifolia/Narrow Leaf or Willow Leaf Fig

Small, narrow leaves that produce excellent branch ramification. Is capable of producing good basal rootage and excellent aerial root formation in humid conditions. Has a habit of dropping leaves if stressed so should be kept in ideal growing conditions.

Ficus benjamina/Weeping Fig

Oval, thinly leathery leaves, easily available but less desirable as indoor bonsai. Has a habit of not taking severe reduction; reductions to the trunk and the branches should be made gradually. Also defoliates easily when stressed. Branches will quickly dieback if no foliage is left on them after pruning or defoliation. Always leave a strong bud or leaf at the very end of the branch to encourage sap-flow.

Ficus retusa var. microphylla/Chinese Banyan

Bears oval, glossy, dark-green leaves upto 10cm long though these reduce with ease. The Chinese Banyan is the probably the classic fig for bonsai especially favoured for its ability to regenerate from very hard pruning, its vigour and willing to cope under poor growing conditions.

Ficus macrophylla/Morton Bay Fig

Bears glossy, dark-green leaves and small red/orange flowers. Readily produces aerial roots given high humidity levels. Rarely drops leaves and can withstand hard pruning.

Ficus rubiginosa/ Port Jackson Fig

Glossy, dark-green oval leaves, again vigorous growing fig, readily producing aerial roots given the right conditions and reduces well.

Ficus retusa 'Green Island'/Green Island Fig

Variety of Ficus retusa that is often seen for sale, similar to previous species but is less tolerant to low light levels and poor humidity which can lead to the loss of inner leaves.

Also worth trying are Ficus burt-davyi, F.regiosa, F.deltoidea, F.aurea/ Strangler Fig, F.petiolaris, F.palmeri, F.traiangularis, F.benghalensis, F.buxifolia/ Box leaf fig, F.carica/ Common fig, F.natalensis/ Natal fig, F.pumila/Creeping Fig.

Bonsai Cultivation Notes

Position Though tolerant of poor light levels and dry air, try to find as bright a position as possible indoors on a sunny windowsill (Ficus will tolerate full sun), Ficus should be kept in position where temperatures do not fall below 15°C. Figs will not die from lower temperatures but continual exposure to temperatures

below this level will cause a gradual deterioration in health. Do not position where the tree will be exposed to cold draughts as this can cause leafdrop through stress. Encourage higher humidity levels with the use of a gravel tray and never place above radiators which dramatically dry the surrounding air. Temperature fluctuations should be kept to a minimum.
During the summer when night temperatures remain above around 12°C, try to place Figs outside where there is increased light, better humidity and warm air circulation to increase health and vigour levels. Most figs grow best in temperatures between 15°C and 30°C. Temperatures above or below this will slow growth; continual exposure will eventually lead to ill-health.
Feeding Feed only when showing active growth; do not feed during the winter if growth stops or if the plant is showing signs of ill-health. Feed with high-nitrogen or a balanced fertiliser fortnightly.
Repotting Repot in Spring every two years using basic soil mix.
Pruning Hard prune in Spring ideally though most figs will tolerate this year round, trim new growth back to shape during the growing season. Figs bleed a milky, white sap (latex) when pruned and this can be used to seal wounds by dabbing with paper or a cloth. When pruning back smaller branches, leave a short stub which will dry out over the following days, removal of this dry stub is easy and leaves a far smaller scar in the bark.
Propagation Figs are very easily propagated from cuttings at any time of the year and from airlayerings.
Pests and Diseases Scale insects and mites can be a problem. It should be noted that Figs will not tolerate insecticides containing Malathion. Leaf loss is nearly always due to stress caused by overwatering or incorrect placement though if conditions are improved, Figs are able to leaf out within 3-6 weeks.
Styling All forms except Literati in all sizes.

Juniperus/Juniper Bonsai

Along with Pines and Japanese Maples, Junipers are one of the three most frequently used genera for bonsai. Juniperus is a genus of 50+ species of evergreen, coniferous shrubs from dry forests and hillsides throughout the world.

Junipers have foliage of two types, needle-like juvenile foliage and scale-like adult foliage, species that exhibit predominantly one or the other are used for bonsai cultivation. The range of colour of the foliage ranges from steely-blue-greens to light greens occasionally with silver or gold hues.

Most of the classic Juniper bonsai in Japan have been collected as yamadori

from the mountains and can reach ages of 200 years or more. Many display large amounts of natural and artificially created deadwood called jins and sharis which are bleached brilliant white with lime-sulphur.

Species and varieties suitable for bonsai

The classic Juniper for bonsai is often referred to as the Chinese Juniper. This is a naturally occurring hybrid species called Juniperus x media which is a cross between J.chinensis and J.sabina. (Confusingly Juniperus x media is also referred to in some textbooks as Juniperus pfitzeriana).

The foliage can have a mixture of adult and juvenile foliage and as this combination can disrupt the design of a bonsai, so varieties of J.media that display only one form of foliage tend to be used. Juniperus x media 'Blaauw' (named by a Dutch nursery 'Blaauw & co') is a strong growing conifer which carries bluish grey-green scale-like adult foliage. As with other J. x media, if needle-like juvenile foliage appears it can be pinched out until adult foliage appears.

Another very popular species for bonsai is Juniperus rigida, the 'Needle Juniper'. As the name suggests J. Rigida has sharply pointed needle foliage as has Juniperus communis a plant found growing wild in many parts of Europe, though it should be noted that collected J.communis is notoriously difficult to keep alive for more than 2 or 3 years after collection.

Juniperus squamata (needle foliage), J.sargentii (scale foliage), J.chinensis, J.Sabina, J.horizontalis procumbens, J.communis hornbrookii are also popularly used as are dozens of other species and varieties.

Other Juniper varieties often used for Bonsai

Shimpaku or J. sargentii

The Shimpaku is a Chinese Juniper variety with bright green new foliage that fades to a darker green when mature. The tree has naturally dense and compact foliage which is excellent for bonsai.

As with a number of Juniper varieties, the foliage can turn a brown or bronze colour after frost and will remain so until Spring when it turns back to a more familiar (and healthy-looking) green.

Blaaws Juniper or J. x media 'Blawii'

The Blaaws Juniper is more vigorous than the Shimpaku but has less naturally well-ramified growth. In comparison, the green foliage has a blue-grey tint.

Sabina Juniper or J. sabina

Common to Europe and similar in colour to the Shimpaku, the Sabina has looser but finer foliage that requires continual pinching out to encourage ramification.

San Jose Juniper or J. chinensis 'San Jose'

A Juniper with blue-green foliage and beautiful red bark, more commonly found in the United States. The San Jose is reluctant to form uniformly adult/scale foliage and on occasions enthusiasts will opt to develop with juvenile/needle foliage only.

Blue-Rug Juniper, Creeping Juniper or J.horizontalis

A very common Juniper variety sold in garden centres and shopping malls across the world, J. horizontalis has very weak trunks and branches leading to a naturally horizontal, creeping growth habit. Predominantly mature/scale foliage in a range of colours from dark green to steel blue (depending on the specific variety). Trunks are very slow to thicken.

Himalayan Juniper or J. squamata

Very commonly found growing in European gardens and nurseries, J. squamata carries juvenile/needle foliage only in a wide variety of colours, depending on the variety. Very vigorous, fast growing and responsive to bonsai techniques but its appearance suffers from the retention of old needles that steadfastly remain on the tree after dying and browning off.

Common Juniper/J. Communis

J. communis is the only truly native Juniper in the UK. A needle juniper with dull-green foliage, the Common Juniper has a terrible reputation for dying inexplicably 2-3 years after collection however garden centre/nursery specimens appear to be far more robust.

Bonsai cultivation notes

Position Full sun though Junipers with predominately scale-like foliage benefit from a little shade from the midday sun. During winter protect during frosts below -10°C but coniferous trees should not be over wintered in dark outbuildings unless temperatures are consistently below -10°C, at this point there is no requirement for light.

Never try to grow Junipers indoors, though they may seem to tolerate indoor cultivation at first, poor humidity, lack of light and dormancy will eventually kill them. *Do not* trust a vendor, seller, book or website that claims Junipers can be grown successfully indoors. Dead Junipers can continue to display normal foliage colour for weeks or even months after they have effectively died.

Watering Ensure Junipers growing in poor, compacted organic soils are not over watered as they suffer root rot easily, foliage should be misted frequently to help keep pores free of dust enabling them to breathe. In the case of trees that have been recently repotted or have root problems, misting is essential as conifers are able to absorb enough water through their leaf surface to maintain health until the roots are able to support the tree themselves. Misting also avoids

excess transpiration and water loss on hot summer days.

Feeding Feed fortnightly; high nitrogen fertiliser from start of growth in Spring until midsummer, balanced feed until late summer followed by low nitrogen until winter. Occasionally replacement feeds with an acidic fertiliser such as Miracid are highly recommended, particularly in hard (lime) water areas.

Repotting

Repot in April, do not repot or rootprune too early in the year. Can also be very successfully repotted during the warmth and humidity of August, however avoid repotting during very hot days.

Once established in a good quality soil, repot infrequently every 3-5 years. Never bare-root a Juniper or change more than a third of the soil (or at very most half) in any one repotting.

An inorganic-clay based soil is essential for Junipers as they are prone to very poor-health in old, compacted, organic soils. Because Junipers cannot be bare-rooted or have more than one third of the soil mass changed in one year, it is essential that a soil with good particle structure is used. Avoid Akadama and similar low-fired clays that break down after one to two years.

Wiring

The wood of Juniperus is extremely flexible and branches of several centimetres in diameter remain supple enough to be shaped with ease. Junipers can be wired at any time of the year including the semi-dormant period of Winter. Do not create heavy bends in trunks and branches during temperatures of 0ºC or less.

For a well-defined Juniper bonsai, the entire tree will require 100% wiring at least once in its lifetime.

The setting time for newly-wired branches depends on the thickness and the vigour of individual shoots; expect anything from 3 months to a year. The greater the amount of growth that emerges from a shoot, the quicker it will thicken and set into its new position. The thicker a branch is, the longer it will take to set.

Watch for wire suddenly cutting into the bark during the Summer as the wood will thicken dramatically during this period, however, shallow wire-marks are not a great problem and will disappear within a few months to a year (again depending on the strength and vigour of the individual branch).

Pruning As with all conifers, branches should always be left with enough foliage to support them, never prune so heavily that a branch is almost devoid of foliage or it will die off.

Junipers grow from early April as temperatures begin to rise at the beginning of the growing season by producing a full flush of new buds and leaves. This is

followed by new extending shoots through the Summer until early Autumn.

The foliage mass can be repeatedly pinched out or scissor-trimmed to shape throughout the growing season. However, after repeated pruning the foliage mass becomes very dense and can block air and light from getting to the lower and interior branches causing them to weaken and potentially dieback. It is therefore important to thin out the foliage mass periodically (once or twice a year) to ensure even distribution of air and light to the foliage as a whole.

Propagation Junipers are easily propagated using several methods. To obtain thick trunks, airlayer branches from mature ground-growing specimens from May to the end of June when the new buds start to extend. Junipers are one of the easiest conifers to airlayer and having rooted, can often be separated from the parent tree by Autumn.

Cuttings can be taken from April to September and will root from 'heel' cuttings. Use one year old shoots (shoots that appeared in the previous year) and pull away the shoot from the tree leaving a 'heel' of old wood at its base. Once potted up, cuttings can exist for up to 2 years on their own sap without rooting; however new extending foliage and shoots from the cuttings will be indicative of the cutting having new roots.

Pests and diseases Relatively disease free though scale can be a problem. Poor draining water retentive composts regularly cause root rot

Styling All forms except broom in all sizes.

Ligustrum/ Privet Bonsai

Ligustrum is a genus of about 50 species of deciduous, semi-evergreen, or evergreen shrubs and trees found in woodland and thickets in Europe, north Africa, the Himalayas, Asia and Australia. They bear opposite, variably shaped, often glossy leaves. In summer they carry panicles of small, unpleasantly scented white flowers followed by small round fruit. Many species of Ligustrum are used for hedging and this can provide an excellent source of material for bonsai. Ligustrum make good material for beginners as they are very forgiving and virtually indestructible.

There are many species of Privet that have good potential for bonsai but it is the following three species that are commonly used; (there are also many varieties of the following species available at nurseries and garden centres which carry differing coloured leaves; try to avoid using variegated leaves as these rarely look good when styled as bonsai)

Ligustrum ovalfolium/Oval Leaf Privet

L. ovalifolium is a vigorous, upright, evergreen or semi-evergreen shrub with oval, rich green leaves to 6cm long. White flowers are borne in dense panicles to 10cm in midSummer followed by spherical, shiny, black fruit. Originally native to Japan, the Oval Leaf Privet can reach heights of 4metres with a 4metre spread.

Ligustrum vulgare/Common Privet

L. vulgare is a deciduous or semi-evergreen shrub with narrowly oval, dark-green leaves to 6cm long. White flowers are produced in panicles to 5cm long in early and midSummer followed by spherical black fruit. In its native Europe, north Africa and Asia, the Common Privet is less vigorous than the Oval Leaf Privet but can still reach heights of 3metres with a 3metre spread.

Ligustrum sinense

L. sinense is a vigorous, bushy, tree-like, deciduous or semi-evergreen shrub with arching branches and elliptic-oblong pale green leaves to 7cm. White flowers are profusely borne in panicles to 10cm long in midSummer and are followed by black spherical fruit. In its native China, Ligustrum sinense reaches heights of 4metres with a 4metre spread.

Bonsai Cultivation Notes

Position Full sun or shade, Privets are very tolerant of both full sun in the Summer and quite deep shade. Privet are fully hardy and only require additional frost protection when temperatures drop below -10°C, however during the winter the colder the temperatures Privet are exposed to, the more leaves they drop; this is a natural reaction and causes no permanent damage even when specimens lose all their leaves in severe cold. The following Spring, new growth very quickly replaces any foliage lost during the Winter. Ligustrum are also sold as indoor bonsai and will also tolerate indoor growing conditions as long as humidity levels remain reasonably high with the use of humidity trays. Ligustrum that are left outside during the Winter must have spent the Autumn outside in order to acclimatise to the cold. Do not place trees that have been grown inside straight outside in the Winter as they will not have hardened off and it is better to leave them inside until Spring.

Feeding Feed fortnightly during the growing season, indoor species should only be fed monthly during the Winter whilst in active growth.

Repotting Annually in Spring as new buds extend; use a basic soil mix.

Pruning Trim to shape through the growing season, remove over large leaves and shoots with over long internodes. Hard prune during the late Winter or early Spring before new growth starts. Wiring can be carried out anytime, though Spring-Summer is best.

Propagation Sow seed outside in Autumn or Spring. Take semi-ripe cuttings in Summer or hardwood cuttings in Winter. Airlayerings can be taken in late-

Spring.

Pests and Diseases Aphids, leaf spot, scale insects, leaf miners, thrips, wilt.

Styling Informal upright forms with single or multiple trunks in all sizes.

Olea/ Olive Bonsai

Olea Europaea is a tender evergreen that thrives in warm subtropical areas, growing to 10metres in height. It has opposite leathery, shiny, narrow dark-green leaves up to 6cm long. Small white flowers in the summer are followed by green olives which given a long enough period of warmth ripen to black. O. Europaea has light-grey bark which becomes particularly gnarled with age. This is a broad-leaved species that lends itself well to areas of deadwood.

Bonsai cultivation notes

Position Full sun. Though able to withstand temperatures to 0°C in its natural habitat, as a bonsai it should not be exposed to temperatures below 7°C. In frost-prone zones Olives are grown indoors, however to retain the health and vigour of the tree, placement outdoors from May until September is recommended.

Feeding Fortnightly from Spring to Autumn, do not feed during the Winter.

Repotting Every second year in Spring. Use a free draining mix.

Pruning Pinch back new growth regularly

Propagation Sow seed at 13-15°C in Spring, semi-ripe cuttings in summer.

Pests and diseases None other than scale insects.

Styles Suitable for all styles except broom and for all sizes.

Sageretia theezans/ Chinese Bird Plum Bonsai

Sageretia are tender shrubs native to Asia and warmer areas of North America. Extensively grown in China for use as bonsai, Sageretia are evergreen in milder climates but become deciduous in temperate zones when exposed to the cold of winter. Sageretia will survive temperatures just below freezing but it is highly recommended to keep them in conditions that rarely drop below around 10°C to keep them in continual growth. For most parts of Europe and North America this means growing Sageretia indoors from around September to May.

Sageretia have symmetrically arranged shiny, oval mid-green leaves to 1.5cm long, young growth is reddish in colour before it matures. The bark quickly becomes scaly and is a dark-brown in colour. In Summer tiny flowers appear in the leaf axils of new shoots and produce large clusters of white

followed by small blue berries. Sageretia are slow to form thick trunks and have very fine formative growth; thick-trunked specimens tend to be imported from China where they are field grown.

Bonsai Cultivation Notes

Position Good light but out of full sun. Grow outdoors when night-time temperatures will not drop below 5-6°C (between May and September in Northern Europe). Indoors, Sageretias need a position that is reasonably humid so a humidity/gravel tray is necessary and should be allowed to cool at night, in for instance an unheated room. Sageretia dislike permanent heat throughout the day as much as they dislike very cold temperatures. Position in good light but do not expose to direct afternoon sunlight when behind glass to avoid scorching.

Feeding Every two weeks in Summer, monthly in Winter when in active growth.

Repotting Every two years in Spring, use a basic soil mix.

Pruning Trim to shape throughout the growing season. Sageretia back bud very easily and produce very dense new growth so can be shaped by selective pruning and wiring can be avoided. Allow young plants to extend 10-15cm before pruning back to shape to allow the trunk to thicken. Mature, thick-trunked specimens can be pruned earlier.

Propagation Softwood and hardwood cuttings root easily throughout the growing season. Sageretia are very rarely seen for sale in Garden Centres and only tend to be offered for sale through bonsai retailers.

Pests and Diseases Can be affected by aphids and whitefly particularly when grown under glass. If affected by mildew, do not lower humidity levels but increase air circulation.

Styling Suitable for all forms and sizes.

Serissa foetida/ Tree of a Thousand Stars or Serissa Bonsai

Serissa foetida derives its name from the fetid smell of its bark and roots when they are crushed or cut. Foetida is literally 'foul-smelling' in Latin. (It should be noted that S.foetida is sometimes referred to by its old Latin name Serissa Japonica).

Serissa is a genus of only one species (foetida), a small evergreen shrub up to only 50cm in height, from moist, open woodland in S.E. Asia. Its leaves are borne in opposite pairs and branches are produced in dense numbers from both old and new wood giving the tree good potential for bonsai cultivation. Serissa produce numerous small funnel shaped flowers during the summer (and at other times of the year in alien environments) hence its common name 'Tree of a

thousand stars'.

There are now quite a variety of forms of S. foetida in cultivation that carry variegated leaves with single or double flowers.

Though very commonly found for sale at bonsai establishments throughout Britain and Europe, the Serissa is notorious for being hard to keep for both experienced hobbyists and beginners alike. The Serissa has a tendency to yellowing and dropping leaves if correct growing conditions are not kept.

Being a subtropical species Serissa have to be protected from temperatures below 7°C which means indoor cultivation is required in most areas of Europe and America for a good proportion of the year. However, here lies the heart of the problem with this species; it is difficult to keep up the humidity levels required by Serissa in an indoor environment and this often causes the tree to suffer.

Bonsai cultivation notes

Position Outside when day and night temperatures stay reliably above 7°C; in Britain this means from late May to mid-September. It is important for the health of the tree to spend at least a few weeks each year outside, however, ensure that the tree is not moved around too much once outside.

Indoor cultivation; when temperatures threaten to dip below 7°C (day or night). Find a bright but not too sunny permanent position out of cold draughts, for instance on a East or West facing windowsill. Good humidity levels must be maintained and can be provided by the use of a humidity tray. Never place the tree on a windowsill above a radiator, (radiators/central heating are the primary reason that indoor cultivation is so difficult as they dry the air considerably) do not place the tree on a windowsill where the curtains are closed at night as this environment can experience very cold temperatures at night during the winter.

Moving the tree to a new position will stress the tree until it acclimatizes, on occasions causing yellowing and dropping leaves-this should be followed within a few days by fresh growth.

Watering Serissa strongly dislike continually wet roots though bone dry compost will also kill them. Water thoroughly (ensure your compost medium is well drained) and do not water again until the compost has NEARLY dried out. Daily watering as a routine should not be carried out unless necessary though daily check the soil daily. Ensure the gravel tray is kept continually wet but never allow the pot to be stood in water.

Yellow leaves can often indicate overwatering (though this can also be due to other factors), brown and crispy leaves indicate lack of water or lack of humidity.

Feeding Feed once a month during the winter (September to March) and

every two weeks between March and September when growth is stronger. Only feed when the compost is already moist or the root-tips can be burnt. Do not feed when the tree has lost leaves or if it is not showing new growth.

Repotting Serissa dislike rootpruning and can be left for 2-3 years at a time. Repot in Spring as growth starts -this helps the rootsystem recover quickly. Use a standard soil mix.

Pruning Remove suckers unless required for multiple trunk styles. Prune back to one or two leaves to shape unless otherwise required.

Propagation Softwood cuttings in Spring or Early Summer. Semi-ripe cuttings in late Summer. Rooting is aided with bottom heat.

Pests and diseases Scale insects. Yellowing leaves and leafdrop caused by incorrect placement, poor humidity levels or incorrect watering.

Styles All forms except formal upright in extra-small to medium sizes.

Ulmus/ Elm Bonsai

Genus overview

Genus of about 45 species of deciduous, semi-evergreen trees occurring in woodland, thickets and hedgerows in Northern temperate regions. Ulmus have alternate, ovate to elliptic toothed leaves usually with very unequally sized bases. Most species display good fall colour.

Ulmus species and in particular Ulmus parvifolia/Chinese Elm are often confused with Zelkova species, in particular Zelkova serrata/Japanese Elm. Zelkova are classed as a seperate genus to Ulmus as they have fruits that are unwinged as opposed to the winged friuts of Ulmus. Zelkova also differ in that they have single-toothed leaves whereas Ulmus have double-toothed leaves.

(Zelkova are listed under their own species guide).

The most common Ulmus species used for bonsai is the Chinese Elm /Ulmus parvifolia, however there is no reason why any of the many Ulmus species cannot be used.

Notes for bonsai cultivation

Ulmus parvifolia/Chinese Elm are often sold as indoor bonsai and as such are acclimatised to indoor growing conditions, however Chinese Elms are temperate trees and fully frost hardy. Chinese Elms grown indoors (or in climates with very mild winters) will remain evergreen whereas outdoor cultivation results in a deciduous tree.

Though Elms should be able to cope with the adverse growing conditions indoors, they are never as vigorous as their outdoor counterparts. To be entirely

frost hardy your Chinese Elm must spend the Autumn outside to harden up for the Winter; never place a Chinese Elm that has been grown indoors straight outside during the Winter,

I am reliably informed that given protection from cold winds and mulching of the pot with straw, soil or bark, Chinese Elm bonsai will actually cope with temperatures of -10°F. (Zone 6 Winters). Chinese Elms planted in the ground will survive in zone 5 Winters; that's temperatures down to -20°F (-28°C).

Position

(Indoors) Well lit, cool position on a sunny windowsill during the winter. Keep up humidity levels. Place outside from May onwards after last frosts have finished. Try to keep outside until Autumn when the leaves can be allowed to fall naturally before bringing indoors.

(outdoors) Outdoor elms/acclimatised elms are fully hardy to frost though freezing winds can result in fine branches dying back if left fully exposed.

Watering

(indoors) Never allow compost to dry out, keep the compost evenly moist. Check the compost daily but only water when necessary. Watering daily as a routine results in sodden compost, leading to lack of vigour, rootrot and eventually death.

(outdoors) As with indoor watering though during periods of strong sun, high temperatures or strong growth in the Spring, trees can need far more frequent watering.

Feeding

(indoors) Balanced feed weekly through Spring and Summer. Monthly through the winter. Do not feed when out of leaf.

(outdoors) Once buds open in Spring, feed weekly with high nitrogen for first month then every two weeks until late summer with balanced feed.

Repotting In Spring as buds extend annually. Elms have very strong and vigorous rootsystems that need annual rootpruning. Rootbound Elms will grow poorly.

Trees overwintered indoors can be repotted in Autumn after leafdrop but before being brought inside. Repot in basic soil mix.

Pruning

One of the main attractions of Elms is the great contrast that can be achieved between a thick trunk and the delicacy of very fine growth at the tips of the branches.

Allow shoots to extend 3 or 4 nodes then prune back to 1 or 2 leaves as required.

Pruning of large branches during the Spring and Summer can cause heavy

calluses; if necessary, the size of the scar can be reduced by carrying out major pruning work in late Summer and Autumn.

Wiring In midsummer though indoor trees can be wired mid-winter particularly if out of leaf. Care should be taken as bark marks easily. Healthy trees can also be defoliated during Winter (if necessary) and mid Summer to enable easier wiring.

Propagation Sow seed outdoors in Autumn or Spring. Greenwood cuttings in Summer. Hardwood cuttings in Winter. Airlayering after spring growth has hardened.

Pests and diseases Elm bonsai are not affected by Dutch Elm Disease as the beetle requires the volume of wood only available to it in fully grown mature trees. An attack (if it were to happen) would easily be dealt with by systemic insecticides and fungicides on a potted tree in comparison to the problems associated with eradicating Dutch Elm Disease on a fully-grown tree in the ground.

Watch for aphids, leafhoppers and gall mites

Styles Suitable for all forms and sizes-especially good for the broom form which replicates the natural shape of Ulmus.

Zelkova/ Elm Bonsai

Genus of about 6 species of deciduous, semi-evergreen trees occurring in woodland, thickets and hedgerows in Italy, Greece, Turkey,Iran and Asia. Zelkova have alternate, ovate to elliptic toothed leaves. Most species display good fall colour of yellows and orange-browns.

Ulmus species and in particular Ulmus parvifolia/Chinese Elm are very often confused with Zelkova species in particular Zelkova serrata/Japanese Elm. Zelkova are classed as a seperate genus to Ulmus as they have fruits that are unwinged as opposed to the winged friuts of Ulmus. Zelkova also differ in that they have single-toothed leaves whereas Ulmus have double-toothed leaves.

(Ulmus are listed separately under their own species guide).

The usual Zelkova species used for bonsai is the Japanese Grey-bark Elm /Zelkova serrata, however there is no reason why any of the smaller leaved Zelkova species cannot be used.

Notes for bonsai cultivation

Zelkova parvifolia/Japanese Elms are often sold as indoor bonsai and as such are acclimatised to indoor growing conditions, Japanese Elms sold as outdoor bonsai and all other species of Zelkova should be cultivated outdoors. Japanese Elms grown indoors (or in climates with very mild winters) will remain

evergreen where as outdoor cultivation results in a deciduous tree. Ensure indoor trees do not become too cold in their first winter outside. Zelkovas should be able to cope with the adverse growing conditions indoors though they are never as vigorous as their outdoor counterparts.

Position

(Indoors) Well lit, cool position on a sunny windowsill during the winter. Keep up humidity levels. Place outside from May onwards after last frosts have finished. Try to keep outside until Autumn when the leaves can be allowed to fall naturally before bringing indoors.

(outdoors) Outdoor Zelkovas/acclimatised Zelkovas are hardy to frost though temperatures below -5°C can result in fine branches dying back and root damage so should be afforded some protection. Frost protection can include placement in darkened outhouses and garages as when out of leaf Zelkovas do not require light.

Watering

(indoors) Never allow compost to dry out, keep the compost evenly moist. Check the compost daily but only water when necessary. Watering daily as a routine results in sodden compost, leading to lack of vigour, rootrot and eventually death.

(outdoors) As with indoor watering though during periods of strong sun, high temperatures or strong growth in the Spring, trees can need far more frequent watering.

Feeding

(indoors) Balanced feed weekly through Spring and Summer. Monthly through the winter. Do not feed when out of leaf.

(outdoors) Once buds open in Spring, feed weekly with high nitrogen for first month then every two weeks until late summer with balanced feed.

Repotting In Spring as buds extend annually until around 10years old or more and then repot as required. Trees overwintered indoors can be repotted in Autumn when brought indoors after leafdrop. Repot in basic soil mix.

Pruning Allow shoots to extend 3 or 4 nodes then prune back to 1 or 2 leaves as required Larger-leaved Zelkovas respond well to leaf cutting in Summer

Wiring In midsummer though indoor trees can be wired mid-winter particularly if out of leaf. Care should be taken as bark marks easily.

Propagation Sow seed outdoors in Autumn or Spring. Greenwood cuttings in Summer. Hardwood cuttings in Winter. Airlayering after spring growth has hardened.

Pests and diseases Zelkova bonsai as with all Elm bonsai are not affected by Dutch Elm Disease as the beetle requires the volume of wood only available to it

in fully grown mature trees. An attack (if it were to happen) would easily be dealt with by systemic insecticides and fungicides on a potted tree in comparison to the problems associated with eradicating Dutch Elm Disease on a fully-grown tree in the ground.

Watch for aphids, leafhoppers, leafspot and gall mites.

Styling Suitable for all forms and sizes-especially good for the broom form which replicates the natural shape of field-growing Zelkova.

Chapter 25 Glossary of Bonsai Terms

This is a glossary of commonly used English bonsai terms; it includes only the most frequently used Japanese terms.

Defining the exact meaning of a commonly-used term is not easy and is subject to interpretation.

ADVENTITIOUS BUD A bud that occurs in an unusual place on a tree.

APEX The highest point of the tree, this can be a single branch or can consist of a series of small branches.

APICAL Growth produced by a plant which is most vigorous, in the majority of species this at the furthest points of the plant from the rootsystem (upper and outermost branches)..

BACKBUDDING Process by which apical growth is pruned to induce growth further back along the branch or trunk.

BUDBREAK The point at which a bud has opened enough to show a green tip.

BUDBURST The point at which a buds contents unfurl (the new leaves appear).

BUD EXTENSION The point before Budbreak where the tiny buds that have been on the branch since the previous year begin to swell and extend.

BLEED To weep sap.

BRANCHES The Primary branches are those that grow directly from the trunk; the Secondary branches are those that grow directly from the primary branches, the Tertiary branches grow from the secondary branches.

BROAD-LEAVED/CONIFEROUS Conifers belong to the group of naked-seeded plants known as gymnosperms, their seeds are not enclosed in an ovary. Conifers have leaves which are needle-shaped or scale-like. With a few notable exceptions they are evergreen. Broad-leaved trees are a much larger group belonging to the angiosperms or flowering plants which have seeds enclosed in an ovary. The majority are deciduous and go dormant in Autumn through to Spring.

BUD Organ or shoot that contains an embryonic branch, leaf or flower.

BUTTRESSING This is also known as root-flare, where the base of the tree flares outwards giving the feeling of great age and solidity.

CAMBIUM Green growth tissue directly below the bark, its increase in size adds to the girth of roots and stems.

CALLUS Tissue that forms over a wound on a branch or trunk as part of the healing process.

CANDLE Name given to the extending bud of a Pine before the new needles open.

CHLOROSIS Loss of chlorophyll and leaf colour as a result of mineral deficiency.

CHOP Commonly used word that describes the heavy pruning and reduction in height of the trunk of a tree.

COMMON NAME Simply the name a plant is commonly known by, however, common names can be very non-specific ('Maple' could refer to any one of hundreds of trees) and can vary from region to region. It is always better to try to remember a trees' specific Latin name as this nomenclature is specific to each and every plant, the world over.

CULTIVAR A cultivated variety of a species *i.e.* Acer palmatum 'Bloodgood' or Acer palmatum 'Deshojo' are both Acer palmatum cultivars or varieties.

DESSICATION Lack of water; desiccated leaves usually occur when the roots are unable to supply water to them.

DECIDUOUS A plant that sheds its leaves each year in Autumn-this can be a broad-leaved or a coniferous tree.

DEFOLIATION The process of partly or completely removing the leaves of a tree during its summer dormant period to induce a crop of finer, smaller leaves which can greatly increase ramification.

DIEBACK Death of growth beginning at tip from disease or injury.

DISSECTED Deeply cut into segments or lobes.

ERICACEOUS A term referring to acid loving, lime-hating plants.

EVERGREEN A plant that remains in leaf all year. It should be noted that evergreen trees slowly shed their oldest leaves at certain times of the year (depending on species) as they are replaced by new growth.

FORM Used to categorise a bonsai using its most conspicuous aspect; this can be according to its trunk direction (formal or informal upright, slanting, cascade etc) or its number of crowns (single trunk, multi-trunk or group) for instance. see notes on forms

GENUS The name given to a group of plants that have a common feature-the first part of a plants Latin name *i.e.* ACER palmatum.

INCH Imperial Measurement replaced by metric nearly 40 years ago but still in use today in some countries. One inch (1") equals approximately 2.5cm, or, just under a typical man's thumb width.

INDOOR BONSAI More difficult to maintain than outdoor bonsai, indoor

bonsai are normally tropical or subtropical species that need to be kept inside for part of the year, usually during periods of cold temperatures outside.

INTERNODE Section of growth between two nodes (leaves or leaf-joints).

JIN A deadwood effect on a bonsai-can be either an old branch or a protruding part of the trunk. Jins can be found naturally occurring on old collected trees though are more often than not, artificially created from unwanted branches.

LAYERING Ground and airlayering are methods of producing new roots from the trunk or branches of a tree; often used as a propagation method but also useful for correcting poor surface rots (nebari).

LITERATI A bonsai form where the tree has a tall, slender trunk with no lower branches and only sparse foliage confined to the upper reaches of the tree.

MAME Name given to bonsai less than 15cm/6 inches in height.

NEBARI Commonly-used Japanese term to describe the surface roots of a bonsai (those that can been seen on or above the surface of the soil).

NODE Growth point on a branch or trunk from which leaves, leaf buds and shoots can arise.

OVERWATERING Where a tree growing in poor-draining soil is given water too frequently (the soil does not begin to dry out before more water is applied). This decreases even further the amount of air available to the roots caused by the poorly drained soil. Eventually leads to dead roots and root rot.

PEAT Inorganic bonsai soil component that has rightly fallen from favour amongst bonsai enthusiasts.

POTENSAI 'Potential bonsai'.

RAMIFICATION The repeated division of branches into secondary branches.

SEASONAL BONSAI Species that only look their best for a short period of the year, for instance trees grown for their flowers or fruit.

SHARI Deadwood on the trunk of a bonsai (as opposed to Jin which is a deadwood branch or protrusion).

SOIL In the context of bonsai, soil does not refer to the soil found in the ground but specialist bonsai soils used for growing bonsai. Organic soils are those that contain ingredients derived from plants; peat, bark or leaf litter. Inorganic soils contain inert materials, mineral, stone or hardened/fired clays such as grit, sand, akadama or turface.

SUIBAN A shallow tray with no drainage holes that is commonly filled with either gravel or water and can house rock plantings.

SPECIES The subdivision of Genus; the second name in Latin nomenclature *i.e.* Acer PALMATUM.

SPHAGNUM MOSS Generic/general name given to long-fibred moss, used as a soil component for bonsai and layering. Sphagnum Moss Peat is rotted and broken down Sphagnum Moss and does not have the same positive properties for bonsai or layering.

STYLE The style of a tree has previously been used to describe the main direction the trunk of a tree takes, this should be correctly referred to as the FORM. The style of the tree describes the way a bonsai has been shaped to create an image of its fully grown counterpart; this can be in a contemporary or a classical style, an impressionistic or an expressionistic style.

SYNONYM An alternative Latin name for a plant, usually an old or invalid classification.

TOKONOMA Traditional display area in a Japanese house where bonsai are brought inside for a short period and displayed with accent plantings and calligraphy.

TREE Commonly bonsai growers will refer to their bonsai as trees rather than as bonsai.

URO A carved (or natural) deadwood hollow, often seen on (but not limited to) deciduous trees.

UNDERWATERING Where a tree is allowed to dry out or is not watered thoroughly when required.

VARIETY The subdivision of Species ; the third name in Latin nomenclature *i.e.* Acer palmatum 'DESHOJO'.

XYLEM Area below cambium in the trunk.

YAMADORI Trees collected from the wild for use as bonsai. Originally used to describe wild trees collected from mountainous regions.

Chapter 26 Glossary of Japanese Bonsai Terms

Though it is not necessary to be conversant in Japanese bonsai terms, it can be useful to know some of the more commonly used words and phrases:

CHOKKAN formal upright form
MOYOGI informal upright form
SHAKAN slanting form
FUKINAGASHI windswept form
SABAMIKI split-trunk
SHARIMIKI driftwood
TANUKI 'cheats'*form where sapling is attached to deadwood* also known as a 'Phoenix Graft'.
HOKIDACHI broom form
KENGAI cascade
HAN KENGAI semi-cascade
SHIDARE-ZUKURI weeping
BUNJIN literati form
NEGARI exposed root form
SEKJOJU root over rock
ISHI SEKI planted on rock
SOKAN twin-trunk
SANKAN triple-trunk
KABUDACHI multiple-trunk
NETSUNAGARI root connected
YOSE UE group planting
SAI-KEI landscape planting
PEN-JING landscape planting
SHARI deadwood on trunk
JIN deadwood branch
NEBARI trunkbase/ surface roots
YAMADORI collected material
SUIBAN shallow water tray for display rock plantings
TOKONOMA traditional Japanese display area
BONKEI tray landscape containing rocks and small accent plants as well as

trees.

Size classifications: exact sizes for each individual class varies from one authority to another; those below are taken from the 20th Grand View Bonsai Exhibition / Nippon Bonsai Taikan-ten.

MAME bonsai less than 7cm in height

SHOHIN bonsai up to 20cm in height

KIFU bonsai between 20 and 40cm in height

CHU bonsai between 40 and 60 cm in height

DAI bonsai over 60cm in height

Final Message

Thank you for reading Bonsai4me: Bonsai Basics by Harry Harrington

B4Me Publishing is a small independent publisher run by just two people and a lot of dedication.

We rely on fellow bonsai enthusiasts to spread the word about our books.

So, if you have enjoyed reading this book, please tell people about it!

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2nd Edition

Bonsai Inspirations 1

by

Harry Harrington

Author: Harry Harrington
Bonsai Inspirations 1
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e-mail us at:
Harry@Bonsai4me.co.uk

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Croatia
info@printera.hr

Edited by:
Ninoslav Pirš

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Foreword, by the author

www.bonsai4me.com was launched ten years ago in October 2001, initially from a huge set of notes I had written in previous years while I tried to decipher the enormous huge volume of conflicting and nonsensical advice offered to bonsai enthusiasts at the time. From just a thousand 'hits' in the first 3 months after it went live, Bonsai4me.com grew quickly as other enthusiasts discovered its existence. At the time of writing Bonsai4me.com now receives over 1.5 million unique visitors every year from such diverse areas of the world such as the UK, America, Australia and even China and Japan, the 'spiritual homes' of bonsai.

This first Bonsai4me.com publication, aimed at all bonsai enthusiasts from complete beginners to professionals and divided into six main sections; each section detailing a different method available to the bonsai enthusiast to develop and maintain their own bonsai and bonsai collection.

Each section is divided into chapters that each describes the progression of a bonsai over time. These image-series have become to be known as 'Bonsai Progressions', have long been a favourite source of education as well as interest and inspiration to visitors to the website.

The progressions were an idea I initially saw at the Internet Bonsai Club many years ago and being able to trace the step-by-step development of a bonsai and the turning of an ugly raw tree into a beautiful bonsai, truly inspired me. I would return to these series of images many times and decided to start a record of the progress and development of my own work. There is a great deal of satisfaction in being able to look back over the years at one's own work and artistry in this way, and I would urge everyone to do the same with their own bonsai and raw material.

Finally, interspersed with each chapter are articles relevant to the progression of the trees including many techniques that I found almost liberating to my way of thinking when I read about them or discovered them during the many hours I have spent working on my bonsai over the years.

My hope is that having read this book, you the reader, will be equally inspired to go outside and create.

Harry

Acknowledgment

My thanks go to my sister Melanie Raymond whose initial idea it was that I started Bonsai4me.com while recuperating after an accident. Thanks should also go to Craig Coussins for taking an interest in Bonsai4me.com in its infancy, to Vic Harris of ErinBonsai.com for his continual help and advice as well as his unique bonsai pots. To Faisal Waheedy for the initial momentum behind Bonsai Inspirations and to Dianne as well as my nephew Barney for looking after my bonsai collection while we were separated! Thanks should also go to Mike Richards for his technical support; both for this book and for Bonsai4me.com.

My express thanks also goes to Ninoslav Pirš whose hard work, encouragement and belief in this book has made it happen.

And finally, a thank you to the tens of thousands of regular visitors to Bonsai4me.com who have made the website what it is today.

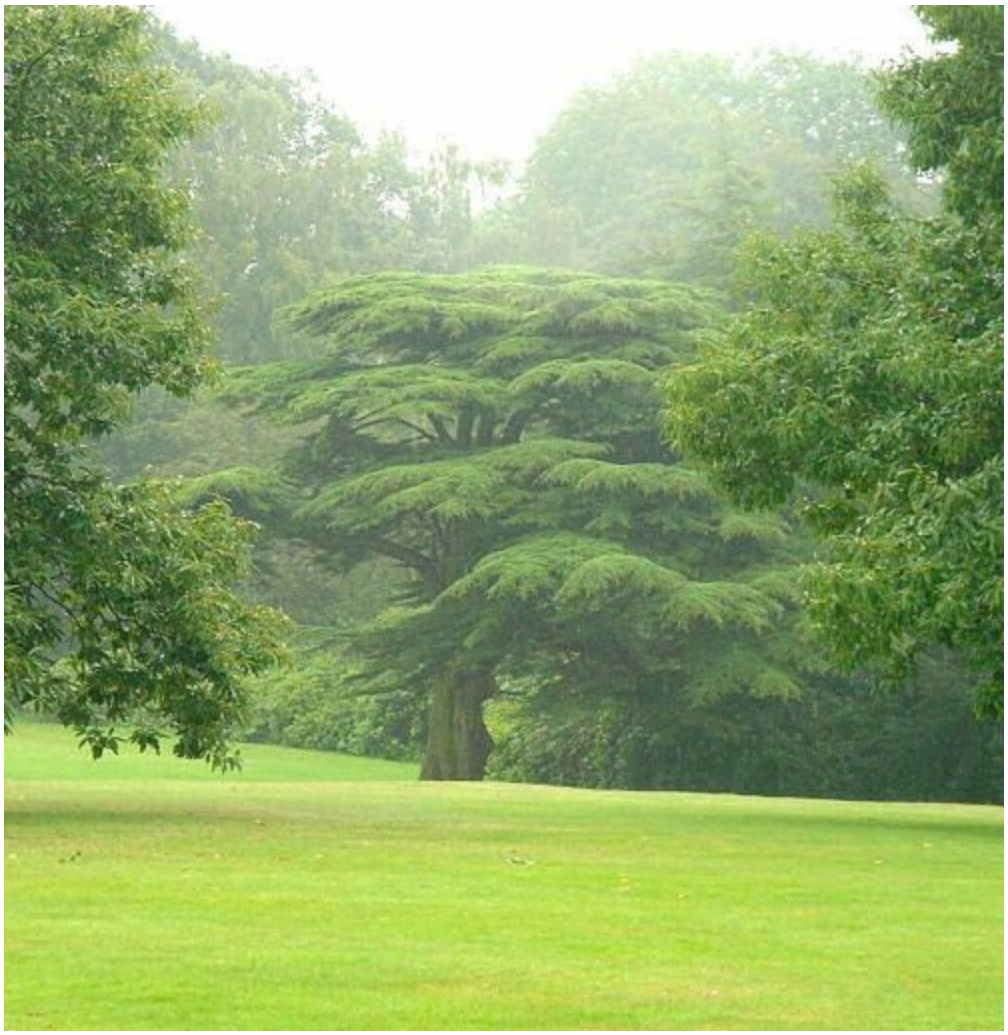
AN INTRODUCTION TO BONSAI

The word bonsai comes from the Chinese words pun-sai, meaning quite literally ‘tree in a pot’.

Originally a practice of containerising ancient wild trees in China, Bonsai was exported to Japan around 500 years ago where it has become an art form. Regarded as a novelty in the West until the early 20th century, Bonsai has now been embraced as a serious horticultural art form by the Gardening Establishment here in Britain and the West as a whole.

The ‘tree’ can be a vine, a shrub or a tree. A common misconception for beginners is that the plants used for bonsai are ‘dwarf’ plants or even ‘special bonsai plants’. Quite simply, bonsai are everyday shrubs, trees and vines. For this reason, they go through their regular seasonal phases, flowering, fruiting and shedding leaves.

Bonsai require the great outdoors in the same way that their ‘untrained’ garden counterparts do.



Trees growing in the wild can elicit a number of emotions in all of us; they can be powerful statements of age and strength as well as beauty as this Cedrus libani photographed at Tatton Park in Cheshire does.

Plants have evolved over thousands of years to take advantage of natural light, wind, rain and seasonal changes. Cultivating them in the unnatural environment of houses mean they have to cope with reduced light and low humidity levels. Your tree may be able to ‘exist’ for a few months indoors, but it will never thrive. Continual indoor cultivation for outdoor trees nearly always results in death unless the tree is given a position outside, to regain its health. There are a few plants that will cope with indoor cultivation for short periods of time; often these are tropical species that require winter protection against the cold, but even tropical species need outdoor conditions after the threat of frost has passed in the spring.

Or create a feeling of serenity and calmness, as with this old Salix caprea growing over the River Ouse.

Some trees can remind us of lost memories of forgotten times and places as this Quercus robur in Norfolk does.

One important concept a beginner has to understand when undertaking

the art of Bonsai, is that the plant retains its small stature through regular pruning. Without pruning, the plant will simply continue to grow until it no longer resembles a bonsai but an ordinary garden plant, or tree. Though the roots of a bonsai are annually pruned, this is not to ‘dwarf’ it. Root pruning produces a small densely packed rootball that enables the plant to be planted in a suitably scaled container. Without root pruning, the plant becomes pot-bound and loses its health and vigour. The process of removing around 1/3 of the roots each year, allows new soil to be introduced into the pot, and space for new roots to grow.

The exposed roots of a Platanus sp., gripping a river bank with high tenacity, creating a contrasting image where the power of the roots is tamed by the calming effect of the water.

Bonsai can vary in height from a few centimetres to a metre. There is no strict height limit. It is simply that the tree is cultivated in a pot and creates an image of an ancient tree in nature. An Oak bonsai a metre high may seem rather large for a ‘miniature’ tree, until you consider that Oaks will regularly reach 50 meters if left unpruned!

Not all trees are necessarily things of beauty but will still conjure emotions in all of us; this old gnarled Quercus robur displays so much age and resilience it is difficult not to admire it.

When first starting out styling and pruning your first trees, you will discover there are many aesthetic ‘rules’ in Bonsai, however, these should only be regarded as guidelines, and you should try to observe and replicate the image of trees that are around you. Try to create a tree that inspires you, whilst retaining the feeling that it exists on the side of a mountain or deep in a valley.

Even younger trees such as these Pines, seen in woodland in Lincolnshire, one can find their own rhythm and movement.

A bonsai should create an image which makes it worthy of repeated inspection whilst retaining its natural beauty and shape.

Bonsai Inspirations

When I first sat down and started work on this book, I quickly decided that I did not want to write yet another mundane, colour-by-numbers bonsai encyclopaedia, a bonsai reference book, or even a how-to book.

Instead, I wanted to make a bonsai book that designed to be enjoyed by bonsai enthusiasts, beginners and experts alike. A book that motivated and inspired their own practice of bonsai.

Bonsai is an art form that crosses many social and political boundaries, where anyone of any background, financial means or horticultural ability can accomplish great living works of art.

And enjoy doing it.

CHAPTER 1

DISPLAYING YOUR BONSAI

A Bonsai Garden

View of the left hand side of the garden where the bonsai are placed on 1 metre tall 'monkey poles'.

View of the right hand side of the garden where smaller bonsai are placed on a long wooden bench that runs the length of the garden.

A low bench along the bottom of the garden is used to display my largest and heaviest bonsai with a taller bench running behind it.

The majority of tree species used for bonsai require the trees to be placed outside all year round. This means that they need to be positioned somewhere where they will be able to receive sunlight for at least part of the day, be protected from strong winds that may knock them over or uproot them and be near a watering point as they will require watering at least 200-300 times every year.

Other considerations for bonsai placement should include more domestic concerns, such as the security of prized specimens, footballs from neighbouring properties and the local cat, squirrel, bird, rabbit and deer populations. All have a terrible habit of damaging bonsai!

Finally, with a living work of art such as a prized bonsai, it is pleasing to be able to view it, in all of its glory out in the garden, and the aesthetic value of careful placement of a tree within a garden is worth considering.

The ideal position for your bonsai is for them to be kept off the ground on wooden benches or monkey poles, and each bonsai is placed in a position where it receives the amount of sunlight needed for healthy growth.

As some bonsai such as Pines require at least 8 hours direct sunlight whilst some bonsai such as Hawthorn or Japanese Maple will tolerate as little as 3 hours direct sunlight, careful observation of the light levels around the garden is necessary. Similarly, consideration of the prevailing winds should be made. Placing a bonsai in an area of the garden that is liable to be hit from the full force strong winds could result in a favourite bonsai (and its pot) being discovered lying in

pieces on the ground after a night of heavy storms.

The heart-shaped flowers of a Dicentra spectablis or 'Bleeding Heart' ring in the forthcoming growing season in March.

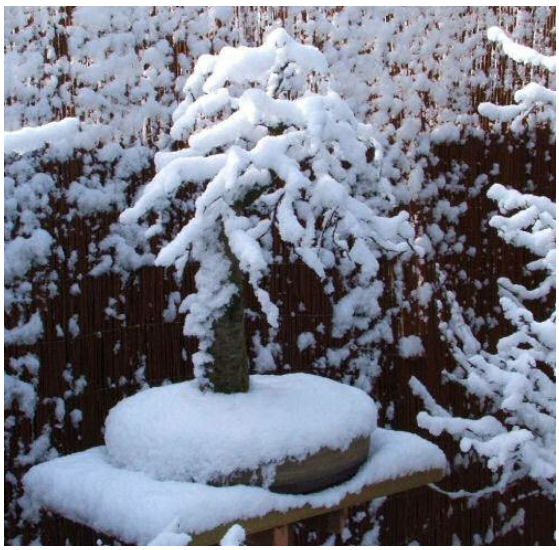
The images in this Chapter have all been taken in my small (10 metre by 10 metre) garden in North-West England. The 3 sides of the garden that are not protected by the house are open to the elements, and are protected by 2+ metre tall reed screening. Along with the obvious aesthetic effects of this screening it also has other uses; principally it provides some good protection from strong winds. Rather than trying to stop or slow the 60 or 70mph gusts of wind, the screen dissipates and slows them down very efficiently. In reality, solid objects such as boundary walls or fencing can have the effect of

increasing the strength and speed of the air as it passes over them. The screen also allows a high boundary around the garden for security without blocking out too much light. While it may not keep a determined thief out of the garden, it does keep my bonsai garden out of sight of passers-by. In a garden this small, every square metre has to be utilised to fit in a large bonsai collection. Along the right hand side is a deep bench that runs the length of the garden, where I display my smaller mame and shohin-size bonsai. The benches along the bottom of my garden face my house, and it is here that I tend to place my favourite bonsai to be viewed and enjoyed to maximum effect. Finally, along the left-hand side I have a number 'monkey poles', small platforms on 10cmx10cm wooden posts. Not only do these allow the bonsai to be placed at an ideal height for viewing, their height also means that I am able to display bonsai, in what is otherwise a very shady North-facing part of the garden.

Living in a temperate climate, I do not grow any tropical or subtropical species as bonsai, as this would require me to house them indoors or in a heated greenhouse. All of my bonsai are fully hardy and are kept outside all year round with no protection from elements. Temperatures rarely drop below -8ºC, this is no problem for frost hardy tree species grown as bonsai; even those in small mame pots. Allowing your frost hardy bonsai to be exposed to the seasons allows them to grow naturally; as they would do in the ground and encourages much healthier and more vigorous growth.

My Bonsai on the monkey poles in my garden braving out a January snow storm.

Following the changes in my bonsai as they go through the seasons is always a delight; from the arrival of the bright new buds on bare branches in spring to the many green hues of the leaves in summer to the vibrant red, orange and yellow leaves in the autumn. And then winter comes, and the fine tracery of bare branches around the gnarled and aged trunk of a bonsai can be enjoyed for 4 months as each bonsai withstands the worst that Mother Nature can throw at them.



Betula pubescens/Downy Birch bonsai covered in snow on a bright morning in December.

A windswept privet (Ligustrum ovalfolium) looking spectacular in the snow.

CHAPTER 2

BONSAI GALLERY

Ligustrum ovalifolium/Common Privet Bonsai
Height 15”/37cm
Developed from an old hedgerow tree collected in 2004.
Pot by Erin Bonsai

Ligustrum ovalifolium/Common Privet Bonsai in winter (reverse angle)

Fagus sylvatica/European Beech Bonsai in Winter
Current height of bonsai; 22”/55cm
Owned since 2001.
Pot by Erin Bonsai

Betula pubescens/Downy Birch in Winter
Height 21”/53cm
I collected this tree in 1999, originally the tree was over 20ft tall but was chopped
before being grown on in the ground for 3 years.
Pot by Erin Bonsai

Crataegus monogyna/Common Hawthorn
Height 28”/70cm
Collected 10 years ago from local grasslands.
Pot by Erin Bonsai

Cotoneaster franchetti in Winter
Height 30”/77cm
Collected 8 years ago from local grasslands.
Pot by Erin Pottery

Ligustrum ovalifolium/Common Privet
Height 19”/48 cm
Developed from an old hedgerow tree collected 5 years ago.
Pot by Erin Bonsai

Developing Your Own Bonsai

Though bonsai can be very daunting to newcomers when they first start out, in reality, bonsai is as simple as you make it.

There are many ways in which a bonsai enthusiast can obtain new bonsai (or material that can be developed into bonsai by the enthusiast themselves), and in the next section of this book I show a number of these methods.

Creating Bonsai From Field-Gown Material

‘Field-grown material’ is a general term given to a tree that is grown in the ground specifically for the purpose of developing as bonsai. The central purpose of growing in the ground is often to allow the tree to grow freely so that its trunk fattens prior to the development of the branch structure.

Field-growing is an excellent method of obtaining cheap raw material for bonsai and is a relatively fast way of developing a trunk (compared to saplings growing in pots and containers. However, it is not a quick-fix. Typically a sapling will need at least 5 years in the ground before its trunk is then suitable for development as a bonsai.

Due to the in previous 'domestic’ use, garden material will often be repeatedly pruned back over the years creating a more compact growth habit. For instance, the subject of the first Progression Series is Privet that despite being over 80 years old had only been allowed to reach a height of around 2metres rather than the 4+ metres of Privet found growing in the wild.

Garden material is often relatively easy to dig up from the ground and has a high survival rate. The well cultivated and watered soils in our gardens have a tendency to create compact rootballs. Care must still be taken to dig up and harvest garden material only at the appropriate time of year (normally during dormancy, and preferably in early spring before the new leaves appear) to ensure its survival.

CHAPTER 3

HORNBEAM

Carpinus betulus/European Hornbeam

Progression Series

This European Hornbeam started its bonsai development as a bare-root seedling in the winter of 2000/2001. Unfortunately, I did not take any images specifically of this tree as it was just one of 50-60 similar seedling/saplings bought for growing-on in the ground during that winter.

WHY WAS THE SEEDLING PLANTED IN THE GROUND?

In the winter of 2000/2001, the trunk was pencil thick and much too thin for use as bonsai of any size. Before any styling or development of the branch structure could take place, the trunk needed to be fattened up.

For this reason, along with all of the other seedlings I bought that year, the hornbeam was planted into the ground and literally forgotten about for a few years. Other than the occasional weeding around the area and some feeding with slow release fertiliser, the tree was just allowed to grow.

The more the tree was able to grow, the fatter the trunk would become.

Any pruning would just slow the speed at which the trunk thickened up and add to the amount of time I would have to wait before the tree (and its trunk) was ready to be developed as a bonsai.

During the first two years, growth can be relatively slow, and with many species, the trunk barely thickens. However, by the third and fourth years of unrestrained growth, most trees will be growing very strongly as had this Hornbeam.

Autumn 2003: the trunk has begun to thicken after the tree has been allowed to grow freely for 3 years.

While no pruning was carried out on the seedling during the early years, a wire tourniquet was applied to its base to ensure that when it was lifted from the ground, it would have the at least the beginnings of a good nebari with plenty of lateral roots around the base of the trunk.

APPLYING A TOURNIQUET TO FIELD GROWN MATERIAL FOR A BETTER ROOTSPREAD (NEBARI)

Sometimes bonsai or potential bonsai can have poor quality nebari/surface roots or lower trunks. This can take the form of too few, overly thick roots, a combination of thick and thin roots or a one-sided nebari which can spoil an otherwise excellent bonsai. This problem can be relatively easily and quickly rectified by using layering techniques such as the tourniquet

method. This method produces numerous roots that emanate radially from all around the trunk which is ideal for quality nebari.

Wrap a thick gauge (2mm+) wire around the trunk and twist the ends together so that the wire fits snugly against the bark without damaging it. Then repot the bonsai into a deeper pot or the ground and allow it to grow unpruned to encourage vigorous growth. New roots can be developed higher up the trunk by air-layering or, if it's only just a little higher than the existing nebari, the ring-bark or tourniquet air-layering method can be used and the tree planted deeper into the ground or pot, so the layering is below the level of the soil.

This Acer campestre (Field Maple) was planted in the ground as a young sapling and has been grown on for 3 to 4 years. Unfortunately, it has a very poor trunk base/nebari. So before being planted back into the ground, a wire tourniquet is applied in order that a new nebari can develop over the next few years.

After one or two seasons when the new root system has become well established, the old root system and trunk base can be removed. A by-product of the tourniquet method is that the base of the trunk above the tourniquet swells, resulting in excellent trunk flare and spreading roots that are flat-bottomed, making them ideal for bonsai cultivation.

This is the appearance of the same tree 3 years after the tourniquet was applied. As can be seen, the new surface roots are pleasantly formed and have numerous fine roots to support the tree.

Using a saw the old root system has now been removed leaving just the new root system.

This technique is carried out in early spring at repotting time. If any root disturbance is necessary in order to apply the tourniquet. However it can be carried out at any time of the year, if the tourniquet can be applied and the soil level increased without disturbance of the root system.

THE PROCESS OF DEVELOPING A FIELD GROWN TREE AS A BONSAI

February 2005. After 4 years growth, I decided to harvest this particular Hornbeam and start the process of developing it as a bonsai. By this stage the tree had reached well over 2 metres in height and had produced a 2”/5cm

trunk-diameter Using the rough ratio of 6:1 (trunk height to trunk diameter), this 2” trunk would be suitable for a bonsai with a final height of approximately 12”/30cm.

For a taller bonsai, the tree would need to have been left in the ground for longer in order to fatten the trunk base further so that the tree still conforms to the height (trunk diameter of 6:1). For instance, for a taller bonsai with a final height of around 24”/60cm, ideally I would have needed to leave the tree growing in the ground until the trunk base was approximately 4”/10cm in diameter.

The image above below shows the trunk base and the tangle of roots that were revealed after I had dug up and bare-rooted the tree to remove all ground-soil. The long strap-like roots are typical of hornbeam.

February 2005: after digging up the tree, the trunk base and roots are washed of ground soil ready for root pruning and shaping.

My first impressions of the nebari were not great, but once the roots were pruned back, it was possible to tell that the wire tourniquet had produced some strong lateral roots that all emerged at the same height on the trunk base; necessary for building a good quality nebari on bonsai. There is a limit to how many the roots of any tree can be worked on in one sitting, so with this initial pruning I concentrated on removing the thickest, most out-of-place roots while keeping as many of the thin feeder roots intact as possible. The fine feeder roots are necessary for the tree to take moisture and nutrients from the soil once it is replanted. Removal of too many at this point could seriously risk the health of the tree and slow its recovery.

February 2005: after pruning and arranging the roots.

February 2005: My intended trunk chop using a low side-branch as the new trunkline.

The hornbeam had been given a rough trunk-chop just before being dug up from the ground. In the image on the left, the red-line indicates where I envisaged chopping the trunk to an upward growing branch in the future, but at that time (early spring); there was no advantage in carrying out the work. It is much better to wait until the tree has had a chance to recover and strengthen before reducing back the trunk to the red-line during midsummer. At this time, healing and callusing of the wound will also be strongest and fastest. The hornbeam was finally planted into bonsai soil in a large container and left to recover.

May 2006. 15 months later and the Hornbeam has progressed well. The

new trunk leader was allowed to grow freely thickening the leader through 2005 to create taper from the point where it had been chopped. Some building of the new branch structure had also begun. Comparing this image with the one from February 2005, it is easy to see why chopping a trunk back to a thinner branch or shoot to increase taper is a useful bonsai technique.

May 2006: the tree is starting to take shape.

December 2006. Six months later and the tree had gone dormant and is pruned; wired and styled (this work is often carried out in early spring in colder climates than the UK as damage can occur to newly wired and pruned branches when temperatures drop below approximately -10°C). The branches were pruned back hard to thinner secondary branches to encourage branch taper (in the same way that the trunk was pruned back to a thinner branch to encourage trunk taper) and to prompt plenty of new adventitious buds during the following spring.

December 2006: after pruning, wiring and styling, the tree is finally ready for its first bonsai pot.

It is better to partially defoliate hornbeams than remove all of their leaves at once. At midsummer, shorten all new shoots to their desired length and then using scissors; remove all new leaves EXCEPT for the two leaves at the tip of each branch. Leave three or four leaves per shoot on any weak branches. 6 weeks later the result will be new shoots emerging from where there had previously been only a leaf. Once the new leaves open, over-sized leaves at the tips of the branches can then be removed.

July 2007. Earlier in the spring, the tree was finally planted into a new bonsai pot from Erin Bonsai.

July 2007: the tree in its new bonsai pot. Leaf-size and ramification have been increased by partial defoliation in June.

In the image on the previous page, the tree is showing the new fresh leaves that are produced after partial defoliation in late June. The tree is allowed to grow strongly in the first half of the year to help thicken up the branches and to ensure its vigour; at midsummer, it is partially defoliated and hard pruned to encourage plenty of new, delicate growth so that the tree can be enjoyed as a bonsai for the remainder of the growing season.

November 2007. As soon as the leaves had lost their autumnal yellow colour and started to fall, I pruned and rewired the branches.

With relatively mild Winter temperatures here in the UK, (temperatures very rarely drop below -7°C or -8°C) I find this the perfect time for doing this work on most fully hardy deciduous species, but care should be taken in colder climates. Note that I have purposely kept what some enthusiasts would regard as branches with ‘faults’. Building the branch structure of a deciduous bonsai where a single branch emerges from first the left, then the right and then the back of the trunk (all of the way to the apex) is a very simplistic approach to learning to build the branches.

While such a simplistic branch structure is easy to understand and recreate, it also creates a cartoon-like appearance that is not reflective of a real deciduous tree. For this bonsai, I have only removed branches that seem out of place and have made full use of the rest to fill out the tree’s silhouette. Note that the branches have also been purposely wired so that they do not create flat plains of foliage (‘foliage clouds’) that one might see on a coniferous bonsai, rather, each branch grows into its own space in the canopy.

Height of the tree 11”/27cm. Trunk diameter above the trunk base 2”/5cm. Current visible root-spread 5”/12cm.

Species Guide

Carpinus betulus/European hornbeam

Carpinus is a genus of 35-40 species of deciduous trees from woodland areas in Europe, Asia and North America. They have alternate, prominently veined, entire or toothed leaves 5-7cm long. Leaves are typically a mid-green through the growing season before turning a bright yellow or red in autumn, with the leaves then remaining on the tree throughout winter. Carpinus species have silvery-purple fluting of the bark which helps identify it from Fagus species/Beech. Though slow as saplings, they become very vigorous growers and Hornbeams can reach heights of 25 metres.

Hornbeams prefer long growing seasons with hot summers however their leaves burn if not given some protection from the sun at the height of summer.

CARPINUS BETULUS

Bright green foliage, turning clear yellow in autumn. Fully hardy though sensitive to early frost in October when still warm trunks and frozen roots can interrupt the flow of sap.

BONSAI CULTIVATION NOTES

POSITION

Slight shade, particularly from the midday sun. Provide some frost protection in winter.

FEEDING

Every week for a month upon leaf break in spring, every two weeks thereafter.

REPOTTING

In spring (as buds extend) every two years. Hornbeams have a tendency to have a small number of straight, vigorous roots that emerge at angles from the trunk base. These need to be pruned hard back to encourage more numerous branching roots.

PRUNING

Pinch out apical buds as soon as possible as they emerge to encourage short internodes. Allow the initial spring flush of growth fully extend and harden off, then prune the new growth very hard. This hard pruning will encourage back budding, and a second flush of shorter, more compact growth for the remainder of the year while also ensuring the tree remains vigorous. Remove large leaves as and when necessary.

DEFOLIATION

At midsummer remove all leaves leaving just one at the tip of each branch.

PROPAGATION

Sow seed outside in autumn. Softwood cuttings in mid-summer.

PESTS AND DISEASES

Coral spot, caterpillars and aphids, sun scorch to leaves.

STYLES

Suitable for all forms in medium to large sizes.

Field-Growing Trees for Bonsai

A common misconception amongst newcomers to the art of bonsai is that trees (bonsai) with large, thick trunks must have had decades of training to become the size they are and that a thin-trunked seedling will one day acquire a thick mature trunk despite being it is planted in a bonsai pot.

Unfortunately, once a tree is growing in the confines of a small pot, with its roots restricted and upper growth regularly pruned, the trunk and branches of the tree will only thicken very slowly.

Large bonsai with thick trunks are nearly always developed in the ground prior to being planted into a pot; some are purposely field grown, some are

collected mature trees.

As a tree develops new growth during the growing season, it lays down wood to feed and supply its new shoots and leaves. The more new shoots and foliage the tree produces, the more wood that is formed to support that new growth. This new wood grows around the outer ring of the trunk and branches in an almost direct passage from the new shoots, back through the trunk to the root system, gradually increasing the trunk's diameter. Therefore, the greater the amount of new growth a tree achieves in a season, the greater increase in the girth of its trunk over the course of that season.

And so, a tree that is allowed unrestricted growth will always thicken faster than a tree that is pruned.

The best way to promote unrestricted growth in any tree or shrub is to plant it into the ground; a large container is an alternative but not equivalent to growing in the ground. (This is chiefly due to the difference in dynamics of soil held within a container and that of a large mass of ground-soil; be wary of planting trees in overly large containers, this can slow growth). Field-growing techniques can be used within any area of ground, if an area of land is unavailable (as is often the case), trees can be enjoyed while they are grown-on in the garden amongst ordinary garden schemes, as 'temporary' 5-10 year hedges or as 'temporary' garden specimens. It is also possible with a little work to build raised beds specifically for the purpose of field growing; raised beds can be walled with brick or wooden planks and filled with good quality soil.

Any tree/shrub species can be used for field growing as long as it is hardy in your local climate. Native species naturally thrive in your local climate and will respond favourably to give the best results; other species will develop well but can take longer to grow with real vigour.

Any age or size of tree is suitable for field growing as long as it is large enough to compete with any grasses or weeds that might compete for light or moisture. Generally, cuttings, seedlings or saplings should be at least 2 years old before planting out unless you are able to cosset them throughout the first year.

GROWTH RATES TO BE EXPECTED FROM FIELD-GROWING

Typically, trees will spend the first year establishing in the ground with some reasonable top growth. The second year will start to show strong growth and bulking up of the trunk. By the third year you should expect to see extremely vigorous growth; if left unpruned, some species such as Trident Maple, Elm and Hornbeam will have easily reached heights of 12ft+ by this stage.

With regard to the trunk diameter, quick growing species such as Tridents, Field Maples, Hornbeam, Elm and Scots Pine can see an increase in trunk diameter from 1/2” as saplings to 2” to 3” at the end of their third year in the ground. Peter Chan of Heron’s Bonsai has described how a 1” diameter Field Maple he planted into the ground 18 years previously, had achieved a 15” trunk!

NEBARI AND ROOT TECHNIQUES

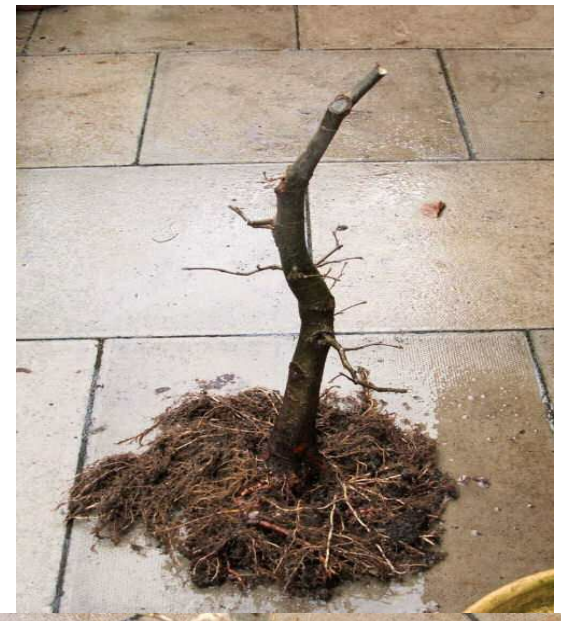
Always consider the formation of the trunk base/nebari when first planting your trees, as the roots will grow strongly in the ground and this is a good opportunity to ensure that your future fat trunk has an equally impressive nebari.

If the tree you are planting has downward growing roots or poor surface roots, consider ground layering it by tying a wire around the base of the trunk. If there is already a good root pattern and strong lateral roots, prune the rootball so that it is shallow and plant the tree on top of a tile, brick or flat piece of wood. As the tree grows, new roots will be unable to grow downwards, and the resulting lateral root growth will ensure the tree is easier to collect and have a much improved root spread and nebari.

PLANTING ON A TILE

This Tilia cordata or Small Leaved Lime on the left has been planted on

top of a tile in the ground for the past 4 years. Last Spring it was lifted and root pruned for the first time. As can be seen below, a year later the result is a flat rootball with strong lateral root growth, ideal for bonsai.



GENERAL CARE AND MAINTENANCE OF FIELD-GROWING TREES

One of the benefits of field growing is that a large number of trees can be planted out for future use as bonsai and left to their own devices without the need for high maintenance care.

Before planting, improve the condition of the soil, though it is not necessary (or possible) to expect a soil of the standard used for container

growing. Clay soils should be improved by adding grit, sand or compost to open up the soil and improve drainage, thin gritty soils should have compost added to improve water retention and nutrition.

For their first season after planting out or after root pruning, care must be taken that the ground is not allowed to dry out down to more than a couple of inches below the soil surface as the root system will not have had a chance to extend further in search of moisture. However, do not keep the soil continually wet as this will actively discourage the roots to grow in search of water, making the tree less drought resistant.

Trees over 3 or 4 ft that have a shallow root system should be staked to guard against being overturned by the wind. Tie the tree to a stake using tree-ties to reduce damage to the bark on the trunk. Try to tie the tree low down on the trunk; though it is necessary to steady the base of the tree to stop the roots being disturbed by the wind, repeated flexing of the upper part of the tree in the wind will help thicken the trunk.

Keep weeds that grow around the trees to a minimum especially around young trees that may not be established enough to compete for light or water. Be wary of weeds that might shade out and cause the eventual dieback of the trees lower branches. It should also be noted that the presence of low-growing weeds will be of no detriment to the tree if they are not shading branches and can greatly reduce the time it takes for mature bark to appear. Weed suppressing membranes can be used on the soil surface prior to planting; this will keep weed growth to a minimum but can cause difficulties in future years when trying to root prune or collect your trees.

Regular feeding of field growing trees is unnecessary though they do benefit from one application of Growmore (or similar slow-release fertiliser) in the spring and one in the summer, particularly on thin, stony soils.

PRUNING FIELD GROWN TREES

Primarily, the purpose of field growing is to develop a thick trunk base and nebari. Until the trunk has developed, there is no need to consider the final branch positions (unless the tree is coniferous). Ordinarily, once the

trunk has reached its final size and girth, all branching will be too thick for use as bonsai and will need to be removed and restarted.

Do avoid continually interfering with your tree! Any pruning will result in less growth and less increase in trunk diameter. Bear in mind that the more wood the tree carries, the thicker the trunk will become, and the more growth it will put out during the forthcoming season.

The only pruning that should be necessary is during the winter in order to control or redirect the trunkline depending on how you envisage the finished trunk to look.

ROOTPRUNING FIELD GROWN TREES

Root pruning your field grown trees will slow down their growth rate and negate the purpose of field growing. However, it is important that the future nebari and root structure is developed or there is a risk that your fat field-grown trunk will be ruined by a poor nebari.

Root pruning should be carried out in early spring as is done with bonsai. Roots should only be pruned to encourage a good nebari. Every second or (preferably) third year, lift the tree and examine the root structure. Any roots close to the trunk that are felt to be unsuitable for future use (for instance crossing roots, roots growing at awkward angles from the trunk, a thick over-dominant root or very straight roots with little branching or taper) can be removed.

Unless you have had the foresight to plant the tree on top of a tile, it is also necessary to remove or at least shorten any downward growing roots. Try to remove as little root as possible and no more than a couple of major roots in one year.

In the last year or two before finally lifting the tree to begin bonsai training, in early Spring, cut around the base of the tree with a spade to encourage fine root growth closer to the trunk.

A Field Maple root-over-rock bonsai being developed in the ground. The roots were wrapped around a rock and the tree has been planted in the ground for over 4 years while the roots form to the shape of the rock. Note the thick sacrifice branch on the left being used to thicken the trunk and trunk base.

The growing bed I have on a plot of land near my home. The image shows just a few of the many trees being left to grow-on uninterrupted for anything between 3 and 15 years.

The trees have been planted through landscape fabric to prevent the majority of weed growth. This means that the growing bed is very low maintenance and it is only necessary to work on or around the trees, two or three times a year.

A Tilia/Lime growing on in the ground in my bonsai garden, surrounded by other bonsai material such as Acer palmatum (Japanese Maple), Ligustrum ovalifolium (Privet) and Crataegus monogyna (Common Hawthorn). Together they also make a pleasing garden display.

A collected Crataegus monogyna (Common Hawthorn) is grown-on in my garden to thicken a new trunk leader and new branches. The increased growth and vigour of the tree in the ground with its unlimited root space speeds up the development time by a number of years when compared to container growing.

CHAPTER 4

BLACKTHORN

Prunus spinosa/Blackthorn

Progression Series

As with the European Hornbeam in the previous chapter, this Blackthorn started life as a bare-root seedling in the winter of 2000/2001, as one of 50-60 similar seedling/saplings planted out specifically for development as bonsai.

No images were taken of the pencil thin sapling in the first couple of years and so this progression starts in June 2003, 2½ years after the sapling was planted into the ground.

June 2003: The blackthorn from what would end up being the front of the tree as a bonsai.

The tree had been allowed to grow freely since being planted into the ground to encourage maximum thickening of the trunk and in particular, the trunk base.

The key to the future design of this tree as a bonsai, is the first branch on the right, once the trunk base had become thick enough the trunk itself could be chopped (pruned) back to this point and the first branch could then

become the new trunkline, creating some movement and taper to the trunk.

As can be seen, development of the trunk can be very slow when field-growing, particularly with tree species such as Blackthorn that are slow to thicken.

By the November of 2004 the trunk base had reached a diameter of 2”/5cm. Using the general rule-of-thumb in bonsai of the height of a bonsai being approximately 6 times the diameter, the 2” diameter trunk base meant I could use it successfully for a12”/30cm tall bonsai.

The trunk was chopped back to the first branch and then the tree was left to recover in the ground for another year.

In March 2006 after 5 years of development in the ground, the blackthorn trunk was dug up from the growing field.

As is normal with deciduous trees, once back in my workshop, I bare-rooted the rootball to remove the ground-soil and planted the tree up into a container, just large enough to contain the root system using good quality bonsai soil.

With the tree sat on a turntable at eye-level on your workbench, it is possible to study properly for the first time. (When trees are still growing in the ground, it can be very difficult to make styling decisions unless you start lying on the floor!)

Any remaining styling decisions were made, and the tree pruned accordingly before being put outside and left to recover.

In the spring, the Blackthorn budded out well and then grew strongly. Blackthorn are a very resilient species and will tolerate a lot of abuse, however, it can be necessary to remove suckers that will emerge from the base after heavy pruning of the top growth or the roots. By midsummer, I was able to prune the tree back very hard to encourage further back-budding

Summer 2006: having been potted up the Blackthorn had burst into life in the spring.

At this point in the tree's development, I was aiming to create an informal upright bonsai with natural up sweeping branches. To accomplish this, I needed to create new branches from about a 1/3 of the way up the trunk, all the way to the apex.

One major concern I did have was the scar from the trunk-chop made in November 2004. In a similar way to Hawthorn, Blackthorn calluses over wounds very poorly (if at all), and the scar was likely to remain visible for a number of years. At that point in time, the only solution I could come up with was to ‘hide’ the scar by choosing a front view of the tree where the scar was hidden from view.

This is a common enough solution but not very satisfactory, particularly as the back view of the tree had by far the best nebari (surface roots) and view of the trunk.

August 2007: developing the new branches. Note that this image is taken of the back of the tree with the large scar very visible.

By August 2007, the branches had grown well and beginning to develop good size and taper. Lower branches were being allowed to grow freely, to encourage thickening while the upper branches were kept short to keep them thinner and in scale. (A detailed examination of the development of deciduous tree branch structures follows in a later chapter of this book). But I still had the same quandary as in the previous year; my favoured viewing angle for this tree was originally intended as the back as it could then hid a nasty scar.

January 2008: After pruning back the branches and much consideration, I decided that there was no reason why I could not use my favoured front view of the tree and use the large scar to my advantage.

In the past, there have been many bonsai enthusiasts that have avoided deadwood on deciduous bonsai. To an extent I agree with them as some types of deadwood should only be seen on coniferous species.

For instance *shari*, long strips of deadwood running along the length of a

coniferous trunk could only naturally occur on a tree species that has a strong relationship between individual roots and individual branches that is supported by individual pathways of live wood up the trunk.

Jin, or protruding pieces of deadwood such as dead branches only occur on the stronger wood of coniferous branches. The softer wood of deciduous trees is far more prone to rotting rapidly (although I should note at this point that there are a few deciduous tree species with very strong wood, such as English Oak/Quercus robur and they can often be seen with jin). However, while the jin and shari of coniferous species cannot be used on deciduous tree species, there is one form of deadwood that is frequently seen and that are uro; areas where a branch has died on a deciduous tree and the resulting wound on the trunk have rotted away leaving a deadwood hollow

With all of this taken into consideration, I decided to use what had been the back view of the Blackthorn and carve the ugly wound to recreate a naturally occurring deciduous deadwood feature. Not only would this mean that I could use a front view of the tree from an angle where the trunk and nebari looked their best, but the deadwood would be a feature that enhanced the image I was trying to create in this bonsai, that of an old tree.

The Blackthorn scar before carving into an uro...

...and January 2008. After carving the Blackthorn scar.

January 2008: the scar was carved using a Dremel with a small router bit that was able to handle the tough wood of Blackthorn. The actual area of the wound was carved so that it had interest, that is, a pattern that had depth and an almost random shape (to avoid the appearance of being a man-made feature).

I then carved further down the trunk from the wound to recreate the impression that it was a large area of the tree that had died away over many years. Leaving the scar as a purely circular shape would have given away that I was, in fact, just trying to hide a 2 year old wound! After carving, the wood was gently sanded to remove any tool marks and small burrs of wood and left to weather to a natural colour.

Deciduous tree deadwood rarely (if at all) turns a white colour so unlike coniferous deadwood features, no lime-sulphur was used to whiten the wood. If the wood were to rot away in the future this would further enhance the feature and cause no danger to the health of the tree whatsoever and so, no wood preservers of any kind were used. If one day the trunk becomes entirely hollow due to rotting, the bonsai will only improve in appearance!

March 2008: Into a bonsai pot for the first time.

Pleased with the appearance of the Blackthorn after carving in January, I decided that it was time to move it into its first bonsai pot ready for the forthcoming growing season of 2008. The bonsai was planted into a pot by Erin Bonsai in March 2008, and the branch placement of the tree was given a final adjustment.

July 2008: the Blackthorn as seen from the front.

By July 2008, the Blackthorn had finally arrived as a bonsai and the new pot complemented the oval green colour of the leaves perfectly. By studying both the front and rear views of the tree, it is easy to see why the new front was my preferred view of the tree. It is also obvious that the large carved area adds maturity and age to the design of the bonsai as a whole.

July 2008: close-up of the carved area of the trunk.

July 2008: the Blackthorn as seen from was initially my intended front but now the back.

CHAPTER 5

ELM

Ulmus procera/English Elm

Progression Series

Developing root-over-rock bonsai is a simple but time consuming technique. The roots of the bonsai must be grown in such a way that they grip the rock or stone securely for both the stability of the tree and the aesthetic integrity of the piece.

For a truly pleasing root over rock bonsai, the roots need to follow the contours of the rock closely. The roots need to create an image that the tree has truly spent its an entire life growing on a large boulder or cliff in nature and without careful development of the roots, this effect is impossible to achieve.

Attempts to tie the roots in place over the rock have a tendency to be poor. This is often the result of the ties marking the roots and causing scars that will take many years to fade; if at all.

This Chapter illustrates what I consider to be a better way of achieving a realistic root over rock bonsai.

Autumn 2001: This English or Field Elm (Ulmus procera) (below) was acquired along with a number of cheap bare-rooted saplings in the autumn of 2001.

Note that not all tree species are suitable for creating root-over-rock bonsai. The species used should have a natural tendency to produce strong, thick roots. Acer (Maple species), Ulmus (Elm species) and Ficus (Fig species) are some of the best examples of trees to use though the list is definitely not restricted to these three genera.

Rather than just plant it straight into the ground to thicken up the trunk, I

decided to try and create a very small (mame) root over rock bonsai.

English Elm, once a familiar sight in Britain before the advent of Dutch Elm Disease, typically has leaves of up to 10cm in length. However, with the use of defoliation techniques and cultivation as a bonsai, leaf size can be quickly reduced to less than 1cm, making the species suitable for mame-size (bonsai that are small enough to fit in one hand) and shohin (up to 6”/15cm in height).

Autumn 2001: the roots of the elm sapling have been draped over the rock and the secured into position with clear plastic.

The bare roots of the Elm were draped over the rock and held into position using clear plastic sheeting, (shrink wrap is ideal), with the fine roots protruding freely below the bottom of the rock and the plastic. The plastic was held securely in place using tape.

The reason I use the plastic sheet is that it holds the roots very tightly against the rock, but it has enough elasticity to allow the roots to swell without cutting into their surface and causing scars.

Horticultural sand was then fed between the plastic sheet and the rock; however small the gap. This is necessary to give the roots a degree of moisture and protection from the cold while still encouraging strong root growth into the soil below the rock.

The rock and bottom roots were then planted temporarily into containers and given protection from any late spring frosts. Occasionally water was sprayed into the gaps between the plastic and rock to help keep up moisture levels.

The following year the tree started to grow vigorously, and I planted it into the ground ensuring that the top of the rock was planted above the soil line; this is necessary to ensure that the tree could not root directly into the soil above the plastic sheeting.

By forcing the tree to only root out through the base of the plastic sheeting, the root sections growing around the rock thicken and start to mould to the shape of the rock.

Once the roots have thickened enough they begin to grip the rock, the classic ‘root-over-rock’ bonsai is formed.

October 2004: After lifting the tree three years later. It is possible to see in this image how the tree is well rooted below the rock. However, at this point there is no way of knowing the condition of the roots under the plastic.

Through the remainder of 2003 and the spring of 2004, the tree was allowed to grow freely to encourage thickening of the trunk and the root system.

As it is when trying to thicken the trunk of a tree, the roots only thicken if the tree is allowed to grow freely. If the tree itself is repeatedly pruned and only grows slowly, the trunk and roots will barely thicken (if at all), and the process of forcing the roots to grip the rock takes considerably longer.

June 2004: By the midsummer of 2004, the tree had been allowed free growth for 2.5 years and had grown some substantial new shoots causing the trunk base to swell. This indicated to me that the roots below the soil surface would have also swelled and grown around the rock. I trunk chopped the tree to start the process of creating trunk taper and movement in their trunk.

Midsummer is an ideal time for trunk chopping, at this time of year wound healing (of the trunk chop) is rapid, and the resulting budding is very strong.

October 2004: the bonsai in leaf as seen from the front.

October 2004: The ideal time to lift the tree out of the ground is spring. However, lifting in autumn can be done successfully with some tree species like Elm. Once the Elm was out of the ground, I cleaned the roots at the bottom of the rock to remove all of the ground soil. The compact rootball meant that I was able to plant the tree straight into a small bonsai pot.

Now it was time to see how the roots growing over the rock had formed.

Carefully, the plastic sheeting was cut away from the rock. The roots had adhered to the rock well. I then proceeded to cut and clean away the remainder of the sand and the tangle of fine roots that had formed under the plastic sheeting.

October 2004: the tree seen from the right hand side.

With the first stage of development finished, it was time to start work on developing the tree into a bonsai.

I finished the day's work by pruning all excess top growth, leaving one new shoot that would be used as the new trunk line.

Winter 2004 Height of Rock 5”/12cm Height of tree 2”/5cm.

When exposing the roots for the first time, ensure that they are protected against sub-zero temperatures as they will not be as frost-hardy as the rest of the tree as the soil they were growing in wild have had an insulating effect.

Winter 2006: Two years later and the Elm has changed dramatically.

Now planted into a more suitable pot from Erin Bonsai, once the trunk had been grown, I used the tiny shoots growing from it to build a branch

structure. New branches were repeatedly pruned back and wired to create branch taper and ramification that had slowly developed over the two years.

July 2006: The dynamic shape of the Elm can be seen from the right hand side. Note that the leaves of this bonsai have now reduced to an average of around just 1cm; the average 10cm leaf size of a fully grown Ulmus procera is now larger than the height of this tree (excluding the roots).

July 2006: The roots of the Elm as seen from the right...

...and the left hand side.

March 2008: And the tree is finally potted up into its ideal-sized bonsai pot from Erin Bonsai.
It is possible to see in this image exactly how tiny those branches are!

March 2008: As seen from the right.

April 2008: Just a few weeks later and the tiny leaf buds of the elm open out, and the tree is in leaf.
Height of the actual tree 3”/7.5cm, height above soil level 8.5”/21cm.

Species Guide

Ulmus minor var.Vulgaris/English or Field Elm

ULMUS OVERVIEW

Ulmus is a genus of about 45 species of deciduous, semi-evergreen trees occurring in woodland, thickets and hedgerows in Northern temperate regions. Ulmus have alternate, ovate to elliptic toothed leaves usually with

very unequally sized bases. Most species display good fall colour.

ULMUS MINOR

The most common Ulmus species used for bonsai is the Chinese Elm /Ulmus parvifolia, however, there is no reason why any of the many Ulmus species cannot be used.

The Ulmus procera featured in Chapter 4 is also known as the Field or English Elm, Ulmus minor. The common and Latin names actually cover several varieties that have very subtle (and often indistinguishable) differences and individual varieties are often almost impossible to identify.

Field or English Elm are native to the UK and many parts of Europe and at one time were found growing prolifically as hedging plants as well as towering field-growing trees. As a result of years of the English Empire and Commonwealth, there are also significant numbers of English Elm found growing in Australia and surrounding areas.

Traditionally farms in the UK would have a copse of English Elm growing near the boundary and were used as a plentiful source of wood with great strength and durability, being used for anything from building construction to coffin building. Due to the resistance of the wood to rot, hollowed Elm-wood was also often used for water pipes (supposedly some still exist to this day) and boat building.

After the advent of Dutch Elm Disease in the 1970’s, much of the population of English Elm was wiped out, and many of the larger specimens seen in the English landscape were lost. However, naturally occurring populations of English Elms still exist, often as hedges or as suckers growing from the bases of trees that have previously succumbed to Dutch Elm Disease.

BONSAI CULTIVATION NOTES

POSITION

Field Elms are temperate trees and fully frost hardy to at least -10ºC. They must be grown outdoors indirect light throughout the growing season.

They require no protection during the winter except where temperatures drop below -10ºC.

WATERING

Field Elms enjoy plenty of water when growing in an inorganic soil. During periods of strong sunlight, high temperatures or strong growth in the spring, trees can need frequent watering.

FEEDING

Once buds open in spring, feed weekly with high nitrogen for the first month if vigorous growth is required. For English/Field Elm bonsai that require refined growth with short internodes, do not feed until the first leaves start to harden off. Feed Elms (of all development stages) every two weeks until late summer with balanced feed. Note that heavy feeding is not required and excessive feeding often just leads to strong algae and moss growth on the soil surface (though it does no harm to the tree).

REPOTTING

Annually in spring as buds extend. Elms have very strong and vigorous root systems that need annual root pruning. Root bound Elms will grow more slowly.

PRUNING

One of the main attractions of Elm is the great contrast that can be achieved between a thick trunk and the delicacy of very fine growth at the tips of the branches. Allow shoots to extend 3 or 4 nodes then prune back to 1 or 2 leaves as required.

Pruning of large branches during the spring and summer can cause heavy calluses; if necessary, the size of the scar can be reduced by carrying out major pruning work in late summer and autumn when callus growth is weaker.

Defoliating can be carried out on healthy specimens in May after the spring flush of leaves have hardened. On very healthy trees, defoliation can

be carried out a second time in July. Remove each leaf by cutting through the leaf stalk at the base of the leaf (leaving the petiole or leaf stalk intact).

Alternatively leaves can be carefully pulled away from the shoots but ensure that you pull in the direction of growth so that the leaf stalk does not tear away from the shoot.

Using a combination of defoliation and pruning, the leaf size of English Elms can be reduced to less than 1cm from their natural size of up to 10cm.

WIRING

Can be wired anytime, although wiring is considerably easier when the branches are free of leaves, through either dormancy or defoliation. Care should be taken as the bark marks easily.

PROPAGATION

Sow seed outdoors in autumn or spring. Greenwood cuttings in summer. Hardwood cuttings in winter. Air-layering after spring growth has hardened is a particularly effective means to acquiring thick trunks of 6”/15cm or more.

PESTS AND DISEASES

Elm bonsai are not affected by Dutch Elm Disease as the beetle requires the volume of wood only available to it in fully grown mature trees. An attack (if it were to happen) would easily be dealt with by systemic insecticides and fungicides on a potted tree in comparison to the problems associated with eradicating Dutch Elm Disease on a fully-grown tree in the ground. Watch for aphids, leafhoppers and gall mites

STYLING

Suitable for all forms and sizes-especially good for the informal broom form which replicates the natural shape of Ulmus.

IN SUMMARY

English Elms are an ideal species for bonsai. Fast growing, vigorous trees with the ability to cope with the most demanding bonsai techniques and development regimes. In this country, my personal preference is to use the native English Elm rather than its more famous cousin, the Chinese Elm. Sourcing English Elm material can be more difficult; however, the effort to locate its whereabouts is always rewarded!

Using Material From The Garden For Bonsai

A great source of material for bonsai are shrubs and trees found growing in gardens, either as part of the garden itself or hedges planted on the boundary.

Due to their ‘domestic’ use, garden material has often been repeatedly pruned back over the years creating a more compact growth habit. For instance, the subject of the first Progression Series is a Privet that despite being over 80 years old had only been allowed to reach a height of around 2 metres rather than the 4+ metres of a Privet found growing in the wild.

Garden material is often relatively easy to dig up from the ground and has a high survival rate as the well cultivated and watered soils in our gardens have a tendency to create compact rootballs.

Care must still be taken to dig up and harvest garden material only at the appropriate time of year (normally during dormancy, and preferably in early spring before the new leaves appear) to ensure its survival.

CHAPTER 6

PRIVET

Ligustrum ovalifolium/Common Privet

Progression Series

August 2004: Over 20 large Privet stumps from a garden hedge had been dug up from the ground; their roots wrapped in wet newspaper and transported 90 miles to my house. (The tree that is featured in this progression series can be seen in a blue bag on the left of the image).

It took me the best part of the next two days to plant each stump into wooden training boxes, bare-rooting each tree free of clay ground-soil and planting each one into a mixture of sphagnum moss and inorganic bonsai soil.

Each stump was also pruned immediately with a rough bonsai design in mind and then left to recover.

Shrubs and trees found growing in gardens, either as part of the garden itself or hedges planted on the boundary are a great source of material for bonsai.

Due to their ‘domestic’ use, garden material will have often been repeatedly pruned back over the years creating a more compact growth habit. For instance, the subject of this Progression Series was over 80 years old but had only been allowed to reach a height of around 2 metres rather than the 4+ metres of a Privet found growing in the wild.

This tree and a number of other stumps came from a hedge growing in someone’s garden on the English/Welsh border (in Shropshire) that had to be grubbed-up to make way for extension work on a private house.

Interestingly, previous to this, the land had been part of an old school for well over a hundred years and though the school had been flattened by the bulldozers to make way for housing development in the 1970’s, the privet hedge had been allowed to survive intact.

The first image above shows the hedge after it had been dug up and brought to my house in August 2004.

August is not a good time of the year to dig up trees. However these Privet had their roots wrapped in wet newspaper and were bagged up to keep the roots as moist as possible before being transported.

Privet is a very strong species; even after bare rooting to remove the wet clay soil at their roots, not one of these trees died.

May 2005: All of the collected stumps had sprouted well and were beginning to grow strongly.

May 2005: As soon as the 2005 growing season started in April, the stump burst into life, throwing out numerous new buds and shoots.

One stump in particular had attracted my attention as having great potential and had rooted so strongly that new roots were starting to appear in between the cracks in the wooden box in which it had been planted!

May 2005: I was immediately attracted to the hollows and shapes that this Privet had. Note that while in the ground the soil had been covering the entire base and only the upward growing 'trunks' had been growing above ground.

As can be seen in the image, new buds had appeared all over the trunks as well as the base. So much so that I was able to start rubbing away buds that I knew would not be needed for the final bonsai design.

One immediate concern I did have though was that the centre of this stump was rotting badly. Before I could consider how to style this tree, it was necessary to see which parts of the deadwood could be saved and protected from rotting further (becoming a feature of the design) and which parts were so soft and pulpy that they needed removing.

I spent around 3 hours carefully carving away the soft pulpy wood in the centre of the tree using my Dremel rotary tool. I used an ordinary drill bit that could easily remove the soft and pulpy wood, but would not remove the stronger wood that had not started to rot.

The result was a very natural deadwood feature that had not been forced by more intrusive carving methods. The loosened chips of wood had to be

literally spooned out of the trunk and by the time that all of the rotted wood had been removed; the trunk was completely hollow and large enough to insert my hand!

While flushing out the remaining debris from the hollow with water, I discovered that water would pool in the bottom of the hollow before draining away into the soil below. This situation needed to be addressed otherwise the wood at the base of the trunk would become wet every time the tree was watered or rained on. Deadwood that stays wet rots incredibly quickly and this was a situation I wanted to avoid.

Having achieved a spectacular deadwood feature, I now needed to rid the trunk of the rot that had created it to ensure the feature was permanent! What was needed was a way for any water that entered the hollow trunk to be able to run straight into the soil. So a large wood drill bit was used to make a drainage hole over 2”/5cm wide at the base of the hollow.

Once the wood had been thoroughly cleaned it was finally protected with around 5 coats of Wood Hardener; this plasticizes the wood creating a finish that is very strong, waterproof and very resilient to rotting in the future. The Wood Hardener is re-applied annually with one or two coats to ensure the deadwood remains intact.

The treated deadwood photographed 3 years later; in total around 8 thick coats of Wood Hardener have been applied over the years.

Once deadwood (or heartwood) on a tree is exposed to the weather, it naturally starts to decay. Hardwoods can take a number of years to fully breakdown whereas softer woods (particularly those found on tropical species) can disintegrate within a year.

Dead and rotting wood can also affect bonsai in ways that look not only unsightly but also threaten the well-being of the tree itself. Deadwood, and in particular, dead softwood that is continually wet, either through poor drainage of a hollow feature or more commonly, that is in contact with the soil, can be particularly troublesome. As the wood breaks down, the rotten area will spread into any adjacent areas of the trunk. If left unhindered, the rot will continue to spread.

CURING ROTTEN WOOD ON BONSAI

Rotten areas should be dealt with quickly; the longer a decaying area of wood is left, the larger it will become. Firstly, gently remove all of the very soft, crumbly wood as this is very difficult to preserve. If this rotted wood travels into the soil of the pot, carefully pull back the soil as far as possible without exposing any live roots. It helps here if the soil is allowed to be on the dry side. It is not necessary to remove all dead or rotten wood; just anything that is particularly fragile.

Next, the remaining wood can be to be treated to kill any remaining bacteria and/or fungi and prepared before the wood is sealed. On coniferous species it is usual to apply a mixture of Lime Sulphur; this will bleach the wood white after a number of applications.

Deciduous species can have lime sulphur applied to help preserve the wood and to treat the wood but the effect of bleaching white is often unsuitable for these species. It is possible however to achieve more suitable tones of grey by adding black Indian

Ink, or acrylic art paint. Brown tones can be achieved by adding coffee granules. If the natural wood colour and patina is to be retained, the wood can be treated with Armillatox; this will have an antibacterial/fungi effect.

Finally, the wood needs to be sealed against moisture in the future so there is no potential of the rot re-appearing. A wood hardener needs to be painted onto the entire area, this will penetrate into the wood and is hardened on contact with moisture, the Hardener bonds and seals the decayed wood together, strengthening it and stopping any further deterioration.

WOOD HARDENERS

Wood Hardener is a clear resin purposely formulated to solve problems with, and cure, rotten and decayed wood. It is often recommended that the Min-wax brand is used in the USA though I have been unable to source it here in the UK. I have however had much success with 'BONDA' and 'RONSEAL' Wood Hardener which seems to be an equivalent product.

The Wood Hardener is applied until it is no longer absorbed into the wood. Try to avoid using too much as any hardener left on the surface will leave the wood shiny. However, this can be successfully rectified by gently sanding to remove any sheen left once the hardener has dried.

I have had no problems with the hardener coming into contact with the live wood of any trees I have applied it to; indeed I have accidentally spilt small amounts onto foliage with no obvious detriment to the plant!

The hardener takes around 24 hours to fully harden during which time it is necessary to keep the area free from moisture. It is difficult to change the colour of the wood after Wood Hardener has been applied; as the hardener

seals the wood, any Lime Sulphur that is applied afterwards will not be able to penetrate and is not as long lasting when on the surface of the wood. Wood Hardener applied after Lime-Sulphuring will seal in the colour permanently.

By July 2005 the tree had grown so strongly that I was able to risk chopping back most of the tall trunks or stumps from the tree.

The resulting growth is shown right after its first styling in August 2005; just a year after collection. The new shoots that had grown from the stump were wired down to become the first (or primary) branches of the tree.

August 2005: the Privet after its first styling.

Note the wooden training box that the tree was growing in; when the tree was initially planted up after collection, I built it just large enough to fit all of the roots without having to prune any of them away.

Wooden training boxes are very useful for situations such as these, where a suitable size or shape of the container is not available. Old planks of wood are simply screwed together ensuring that there is adequate drainage in the base and the box does not rest directly onto the ground.

At this point I realised that the tree would start to look good within 12 months and it would be worth ordering a bonsai pot to plant it into in the spring of 2006.

March 2006. Just 18 months after collection, I repotted the Privet into a pot commissioned from Erin Pottery. The tree was found to have rooted wildly and was root-bound in its wooden grow box!

March 2006: pictured next to my son, aged 10, is the tree in its new bonsai pot. The next few years would be spent continuing to develop the branch structure.

For a better indication of the bonsai's size, here is my son (aged 10 at the time) pictured next to the tree.

August 2006: Just 5 months later and the tree has developed rapidly. Having allowed the spring flush of growth to grow freely, the foliage was pruned repeatedly from midsummer onwards to increase its density.

August 2006.

July 2007: As with last year, other than in the very top branches, the tree was allowed to grow freely until midsummer at which point it was pruned back hard.

This has two effects; firstly it helps to slowly thicken the middle and lower branches and secondly, allowing free growth invigorates and strengthens the tree as a whole.

January 2008: After a few winter frosts have caused many of the leaves to fall naturally (Privet are semi-deciduous and will naturally lose leaves when exposed to the cold). I had taken the opportunity to fully defoliate the tree so that I can study and refine the branch structure.

Each and every branch is considered during dormant-period styling. Those that are not growing in the desired direction or angle are rewired into position. New shoots and branches that are no longer essential to the design are removed.

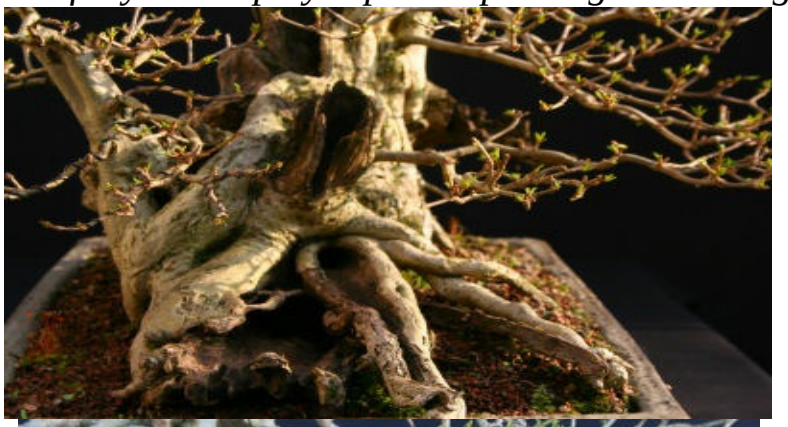
January 2009: A year later and 4½ years after the tree was collected from a garden on the Welsh border, the tree has come of age.

The tree seen from behind.

Close-up of the apex of the main trunk. As can be seen in this image, small adjustments are continually made to the position of branches all over the bonsai using wire. The tree has been fully defoliated each Summer and each Winter; the removal of the leaves results in new shoots appearing where each leaf has been removed, greatly increasing ramification (or the 'twigginess' of the foliage mass). The newly emerged leaves resulting from this defoliation are also smaller and more compact.

Images showing the tree from the right and the left show how I have built the branch structure. Notice that the tree leans towards the viewer when the tree is seen from the front.

The bonsai seen from above. Over the years the branch structure has been carefully built up by repeated pruning and wiring.



Views of the hollows and channels on the right hand side of the bonsai, and of the centre as seen from above.

One interesting part of this tree is the stone that is embedded in the main trunk; at some point in the past decades, while the tree grew in the ground, the stone must have become caught between two of the tree's branches. As the branches have thickened over the years, they have swelled and grown together around the stone, and it is now very much part of the trunk.

September 2009: the bonsai in leaf. Throughout 2009 I continually removed the larger terminal leaves that Privet produce and completely defoliated the bonsai twice. The result has been greatly reduced leaf size. Leaf size is now just 2mm-5mm compared with the 10-20mm leaves of a privet growing in the ground.

Privet bonsai seen from behind.

Species Guide

Common Privet/Ligustrum ovalifolium

Ligustrum is a genus of about 50 species of deciduous, semi-evergreen, or evergreen shrubs and trees found in woodland and thickets in Europe, North Africa, the Himalayas, Asia and Australia. They bear opposite, variably shaped, often glossy leaves.

In summer they carry panicles of small, unpleasantly scented white flowers followed by small round fruit. Many species of Ligustrum are used for hedging and this can provide an excellent source of material for bonsai. Ligustrum make good material for beginners as they are very forgiving and virtually indestructible.

There are many species of Privet that have good potential for bonsai but this Species Guide describes Ligustrum ovalifolium only and care should be taken with other Ligustrum species as hardiness varies across the genus.

LIGUSTRUM OVALIFOLIUM

L. ovalifolium is a vigorous, upright, evergreen or semi-evergreen shrub with oval, rich green leaves to 6cm long. White flowers are borne in dense panicles to 10cm in mid-Summer followed by spherical, shiny, black fruit.

Originally native to Japan, the Oval Leaf Privet can reach heights of 4metres with a 4metre spread.

BONSAI CULTIVATION NOTES

POSITION

Full sun or shade, Privets are very tolerant of both the full sun in the summer, as well as deep shade. Privet are fully hardy and only require additional frost protection when temperatures drop below -10°C.

During the winter, the colder the temperatures Privet are exposed to, the greater the number of leaves they lose; this is a natural reaction to cold temperatures and causes no permanent damage even when specimens lose all their leaves in severe cold. The following spring, new growth very quickly replaces any foliage lost during the winter.

FEEDING

Feed at least fortnightly during the growing season. Ligustrum ovalifolium is a very hungry species and will welcome heavy feeding. I feed my Privet with a fortnightly liquid fertiliser (20-20-20) as well as slow release fertilisers.

REPOTTING

Annually in spring as new buds extend; use a basic soil mix. Root growth on Privet is very vigorous and without regular root-pruning, the tree will quickly become root-bound causing growth to slow considerably. Privet will tolerate heavy root pruning of over 1/2 the root mass and this also invigorates bonsai that have become weak through being root-bound

PRUNING

Trim to shape through the growing season; remove oversized leaves and shoots with overly long internodes. Hard prune during the late winter or early spring before new growth starts. Wiring can be carried out any time, though Spring-Summer is best. Defoliating can be carried out anything up to 3 times a year on healthy specimens.

Privet produce buds early in the spring but are late to start into growth, new shoots may not extend until as late as June.

Once the new leaves begin to harden in July defoliation can be carried out on healthy specimens. If the bonsai is strong it will respond with new leaves that can be defoliated in August. Finally, healthy trees can be defoliated during the winter when leaves naturally begin to fall due to the cold.

PROPAGATION

Sow seed outside in autumn or spring. Take semi-ripe cuttings in summer or hardwood cuttings in winter. Air-layering's can be taken in late-Spring.

Developing Privet in the ground can be a slow process; despite their vigorous growth, it takes a surprisingly long time to thicken up the trunk. Old Ligustrum ovalifolium are frequently found growing in gardens, often as hedging material and are exceptional material for bonsai.

Such specimens are very easy to collect and make an ideal candidate for those collecting for the first time. While it is preferable to collect as much of the root system when digging up any tree from the ground, Privet will tolerate being collected with a bare minimum of roots and even out of the ideal season.

Be warned, a poorly collected Privet may sulk for a year or two until they are strong enough to grow again!

PESTS AND DISEASES

Aphids, leaf spot, scale insects, leaf miners, thrips, wilt.

STYLING

Informal upright forms with single or multiple trunks in all sizes.

The nature of Privet growth means that it is an ideal candidate for carving, shari and uro not only add interest to a design but also hide large wounds where heavy branches or trunks require removal.

The wood, though occasionally very tough while still fresh, does have a reputation for rotting as it ages. It is strongly suggested that all deadwood is sealed with wood-hardening products to prolong its life.

CHAPTER 7

Spiraea 'Goldflame'

Spiraea japonica ‘Goldflame’

Progression Series

Spiraea japonica is a relatively rarely used species for bonsai and is better known in British gardens as a low growing ornamental garden shrub.

Native to China and Japan, it has oval leaves that show a variety of colours through the seasons and as an added bonus, it bears pink or white flowers during the summer.

As a garden shrub, Spiraea has a large number of varieties which carry varying leaf and flower colours.

Spiraea have a natural tendency to produce a large number of thin shoots or ‘suckers’ from the base that are not particularly suitable for bonsai. However, on occasions, older garden specimens can be found that are suitable for multi-trunk bonsai such as the bonsai described in this Chapter.

2002 After digging up the Spiraea for the first time.

This Spiraea started out as a cutting I took for my garden in 1995. It was

duly planted out in a flower bed for around 7 years and enjoyed for its leaf colour and summer flowers.

However, during the winter of 2002 I lifted the plant to make room for some new bonsai benches and found it had developed an interesting base and a naturally shallow rootball with a good spread of lateral roots. So rather than planting it back into the ground as a garden plant, I decided to start developing it as a bonsai.

June 2003: by the following year, the Spiraea had recovered well but was still looking very spindly!

As can be seen in the image the plant was a mass of suckers or basal shoots, all of which were very thin (less than 1cm in diameter). None of the shoots were suitable as a single bonsai trunk, but there was a good possibility that I could select 3, 5 or more shoots to become the trunks of a group or clump planting.

Many of the shoots available to me were very straight and lacked taper, but I was finally able to find 3 shoots that had some taper and movement (they had natural bends and curves rather than being very straight). The plant was then put to one side of the garden where it could recover.

By June 2003, the tree had recovered well from its collection. Much of 2003 was spent repeatedly removing the many suckers that kept appearing at the base of the three trunks.

Thin spindly ‘trunks’ are typical of Spiraea, they are more of a shrub than

a tree and don't normally produce thick trunks at all. During the winter of 2003, as the Spiraea the tree had obviously recovered from its severe pruning of the previous winter, it was planted back into the ground to try and thicken the 3 trunks.

August 2005: The Spiraea growing in a flower bed in my garden.

August 2005: After digging and potting up the Spiraea.

August 2005. Two years later and the tree has to be lifted again to make room in the garden. August is not the best time to repot many tree and shrub species but given the species, the local climate that is cool and humid in August and compact rootball that this tree had I knew I could get away some very out-of-season transplanting!

August 2005: A few hours later and the tree is potted up into a shallow terracotta saucer having been bare-rooted. Though, in this case, the tree survived this transplanting and continued to grow well into the autumn, I have to repeat that my timing for repotting is not recommended!

As can be seen in the image, with all suckers from the base repeatedly removed (there were less and less each year), the remaining three trunks had thickened reasonably well over the 2 years and were starting to give the believable impression of 3 connected trunks.

June 2006 and the tree is in flower. The tree was potted into a freeform-oval pot by Vic Harris of Erin Bonsai in the spring, the red-brown colour of the pot matching that of the bark perfectly. The branches were then carefully wired and positioned.

June 2006: The Spiraea bonsai flowering for the first time in its bonsai pot.

Spiraea japonica 'Goldflame' flowers.

In order for the tree to flower, it had to be allowed to grow freely since leaf break in spring as the flowers form on new shoots. When flowering finishes, the branches are then pruned back hard and the foliage developed until the end of the year.

Autumn 2006: That Autumn the Spiraea rewarded me with some stunning colours, starting with the brightest crimson one could imagine through to oranges and yellows the leaves positively glowed for 2 to 3 weeks.

Autumn 2006: Autumn colour.

Here, the close-up images of the bonsai show the trunks and base in better detail.

Despite none of the trunks being thick enough for use as an individual bonsai, together they successfully recreate an image of a small clump of trees rising from the landscape that the viewer could walk around or even climb through.

The trunk base that once simply sprouted a tangle of suckers and basal shoots now appears to be the massive root base of the three trunks giving an aura of age to the piece.

Winter 2007: The Spiraea reveals its delicate branch structure after it has lost its leaves for the winter.

Winter 2007: Following the annual display of autumn colour, the leaves fall from the tree and for the first time since the Spring I am able to study the branch structure. Within days of the last leaves falling from the tree, I prune back any shoots that have grown outside the intended silhouette of the tree and then I start to wire the tree. New shoots that have appeared during the year will tend to have grown very straight and in random directions. These shoots require wiring so that they can have movement (bends and curves) put into them and also be placed so that they are growing outwards or upwards toward the light. The sight of 100's of tiny random shoots all growing in unison towards the light is one that I love seeing once the leaves of a deciduous tree fall in autumn.

Spring 2008: Spiraea are one of the first species used for bonsai to

produce new buds and leaves in the Spring and produce a welcome relief to the drab colours of the bonsai garden in late Winter. The new spring buds and leaves produce colours rivalling those of the previous autumn and let you know that the warmth of the new growing season is nearly upon us.

Spring 2008: Spiraea are one of the first species to produce new leaves and shoots in the bonsai garden.

Species Guide

Spiraea japonica 'Gold-flame'/Spiraea

Spiraea is a genus of around 80 species of deciduous or semi-evergreen shrubs found in rocky places, thickets and woodland. Widely distributed in northern temperate regions of Europe, Asia and North America including Mexico. Spiraea have alternate leaves that are entire, toothed or lobed and in many species are decorative. There are two Spiraea species that are commonly used for bonsai, S. japonica and S. thunbergii. Both species include a large number of varieties with differing leaf and flower colours.

SPIRAEA JAPONICA

Spiraea japonica is a clump forming, deciduous shrub with erect shoots, native to China and Japan where heights of around 2metres are reached. It has ovate, sharply toothed, dark-green leaves to 10cm long. In mid- to late-Summer, it bears bowl-shaped, pink or white flowers in terminal corymbs to 20cm cross. As a popular garden shrub, Spiraea japonica has a large number of varieties which carry varying leaf and flower colours.

SPIRAEA THUNBERGII

S. thunbergii is a dense, bushy, deciduous or semi-evergreen shrub with arching branches and slender, lance-shaped, sparsely-toothed, light-green leaves to 4cm. In spring and early summer, it bears bowl- or saucer- shaped white flowers in clusters to 5cm across. Native to China and Japan where heights of 1.5metres can be reached. The horticultural notes below can be applied to both S. japonica and S. thunbergii.

BONSAI CULTIVATION NOTES

POSITION

Spiraea love full sun but will tolerate partial shade. Areas of the tree that are allowed to become permanently shaded will have considerably less foliage so ensure that the tree is rotated from time to time. Frost hardy to at least -10°C.

FEEDING

Every two weeks throughout the growing season. Do not require heavy feeding in a bonsai pot.

REPOTTING

Every two years in spring as buds extend.

PRUNING

Spiraea produce numerous long arching shoots from old wood in Spring and these need to be pruned back hard or removed to keep shape. However after the first flush of leaves has begun to harden off, pruning should be stopped to allow flowering to occur. After flowering, prune back repeatedly to shape through the remainder of the season. Deadhead spent flowers. Once branches have hardened and lignified they become very brittle; wire whilst shoots are still young.

PROPAGATION

Take greenwood cuttings in summer and hardwood cuttings in winter.

PESTS AND DISEASES

Trouble free though mildew can be a problem in warm, damp conditions. If so, provide a position with better air-circulation.

STYLING

Suitable for informal upright, slanting and cascade forms in extra-small to medium sizes. Especially suitable for clumps or root connected bonsai.

Developing Ready-Grown or ‘Finished’ Bonsai

It is a sad fact that we all know people that ‘once bought or were given a bonsai, loved it, but it died’ and have never pursued their interest, often in the belief that bonsai was something they could not do.

In fact, very often the death of their tree was due to poor quality information on the part of the vendor and a bonsai growing in soil with similar qualities to that of cement.

However, armed with some good basic information, it is well within the means of anyone to go and buy a bonsai from a garden centre, shopping mall or a bonsai nursery and teach themselves how to keep their purchase healthy and alive.

CHAPTER 8

TRIDENT MAPLE

Acer buergerianum/Trident Maple

Progression Series

This bonsai was originally purchased in the summer of 2007 as a ‘finished’ tree. I have rarely had the opportunity to purchase trees as well developed as this one, and it was enjoyable to acquire something that was more than just a tree stump! However, there were improvements both horticulturally and aesthetically that could still be made.

One of the most important was to establish the type of soil the bonsai was growing in, and if necessary, prepare to repot the tree as soon as possible (normally the following spring).

It is an unfortunate fact that the vast majority of bonsai sold in this country and across the world, are sold growing in poor and substandard bonsai soil. With depressing regularity, I see enthusiast’s bonsai that are in poor health, dying or just plain lacking vigour, only because they are struggling to grow trees that have not been properly repotted after purchase.

The foliage mass of a bonsai can be regarded as a mirror image of its root-mass; if the roots are in poor health and lack vigour, the rest of the tree will be.

August 2007: This Trident Maple was the last of a number that had been imported into the UK around a decade earlier and this particular one had remained unsold ever since. At 75cm in height, it had an impressive size, and judging by the colour of the foliage, it was in fairly good health. However, although it had a wide nebari and trunk base, both were ugly, and the trunk had a section of inverse taper where it bulged halfway up.

Of most immediate concern to me was the state of the soil in which the bonsai was growing. As can be seen in the image above, the soil surface was

covered in a weed known as Liverwort. Liverwort is a hard to remove weed that prefers wet organic soils; its presence is a strong indicator of a soil that is too wet and drains poorly.

August 2007. Immediately after purchase from a bonsai nursery in Norfolk, UK.

August 2007: as is normal for newly purchased bonsai, the condition of the soil was not impressive.

AN INTRODUCTION TO BONSAI SOILS

One of the most important subjects for new (and it seems some more experienced) bonsai enthusiasts is soil composition. If you are not already using a high-fired clay (an inorganic soil mix) for your bonsai, then this article has been written specifically for you!

Ready-mixed soils can be bought from bonsai nurseries and garden centres, but these tend to be relatively expensive and not very good quality. Faced with repotting more than 3 or 4 trees in the spring, most enthusiasts learn to mix their own soils.

There are a large number of soil ingredients that can be used when mixing your own soil; different mixes are used by different enthusiasts with varying degrees of success. For the beginner, choosing which soil mix to use for their bonsai can be a daunting choice.

THE BASIC REQUIREMENTS OF BONSAI SOILS

A bonsai is confined to a relatively small quantity of soil throughout the year on which its very existence depends. Through the soil in the pot, the tree must be able to obtain water, nutrients and gases in order to grow. For this reason, a bonsai must be planted in a good quality bonsai soil. The quality of the soil that is used directly affects the health and vigour of the tree. It is my experience that unhealthy trees that lack vigour are very often also planted in a poor (often organic) bonsai soil.

There are a number of qualities that are required in a good soil mix;

Good water-retention. The soil needs to be able to hold and retain sufficient quantities of water to be able to supply moisture to the bonsai between each watering.

Good drainage. Excess water must be able to drain immediately from the pot. Soils lacking good drainage are too water retentive, lack aeration and are liable to a build up of harmful salts.

Good aeration. The particles used in a bonsai mix should be of sufficient size to allow tiny gaps or air pockets between each particle. It is essential to the health of the roots that they have access to oxygen.

A particle-based, well-structured inorganic soil allows fast drainage of water and allows fresh air to enter the soil continually. A compacted organic soil that lacks any structure also lacks aeration and drainage, and this can lead to ill-health in the roots and tree and root rot.

VARYING SOIL MIXTURES TO SUIT DIFFERENT TREE SPECIES

Though all Bonsai require free-draining, water-retentive soils, different species vary in their requirements for water and nutrients, and this should be reflected in their soil composition. Pines and Junipers, for instance, require less water than most other species. This, in turn, means that they require a less water retentive soil mix.

Alternatively, flowering and fruiting species have increased water requirements and tend to be planted in soil mixes with relatively high water retaining capacities. When mixing your own soil, the ratio of water-retaining material to drainage materials is varied according to the tree that it is intended for. Very often grit is used to provide additional drainage to a bonsai soil. By increasing the ratio of grit to the mix, the soil becomes increasingly free-draining; by increasing the amount of water-retentive material, the greater its water-holding capacity becomes.

ORGANIC OR INORGANIC SOILS

Soil mixes are described as being either organic or inorganic. Dead plant matter such as peat or leaf-litter or bark is described as being organic soil components. Inorganic soil mixes contain little to no organic matter; instead, they are made up of specially-formulated soils such as volcanic lava, calcined (baked) or fired clays.

ORGANIC SOIL MIXES AND COMPONENTS

In past decades, Western bonsai enthusiasts tended to use organic soil mixes, using a large proportion of peat, bark and leaf-litter mixed with grit to aid with drainage. As time has passed, our knowledge and understanding of bonsai in the West increased.

It is now acknowledged by most enthusiasts that organic soil components such as peat are not conducive to the good health and vigour of a tree.

Peat and other organic soil components have many disadvantages; they are too water retentive, leading to the soil being continually sodden, particularly during periods of rain in Autumn, Winter and Spring.

Conversely, during periods of high temperatures, dry peat can be difficult to thoroughly water, leaving dry spots inside the rootball of the bonsai.

Possibly the most serious problem with organic soils is that though they may consist of appropriate sized particles when the bonsai is first planted they continue to break down in a bonsai pot and become compacted. As the soil compacts, it becomes airless and drains poorly. Such waterlogged and airless soils effectively suffocate the roots and can lead to rotting roots and ill-health in a bonsai.

The only organic component that I would still recommend using as part of a bonsai soil mix is composted bark, sifted to remove any particles less than 2mm. While bark will break down very slowly, it still holds its structure for a long time and until then, will not impede the air circulation or drainage of a bonsai soil.

INORGANIC SOIL MIXES AND COMPONENTS

The advantage of inorganic materials is that they hold their open structure for a long time without breaking down into mush. Inorganic materials retain a particular quantity of water and any excess is immediately flushed through the bottom of the pot; it is difficult to 'overwater' a bonsai planted in a good inorganic bonsai soil mix.

Akadama is Japanese baked clay, specifically produced for bonsai and imported into the West; it is normally only available from bonsai nurseries and therefore can be difficult to locate. There are a number of grades of Akadama available including 'Double Redline' that is more costly but is better premium quality. Akadama has been the soil of choice for many Japanese bonsai Masters and enthusiasts. This is partially due to its relatively low price in Japan where it is also easily obtainable.

However, while Akadama might be considered a good quality soil, in my opinion it is no better than the cheaper and more easily obtainable fired-clay soils that are produced in the West. Akadama can break down into a solid mush within 1 or 2 years. This old soil must be washed out of the roots every one to two years. For this reason, it is definitely not recommended for species that will not tolerate regular bare-rooting of the whole rootball (Pine, Larch

and Juniper for instance).

Seramis/Turface/Oil-Dri are fired clays that are readily available in the UK and US compared to Akadama. Fired clays are also stronger than Akadama and thus will not break down over time.

As with Akadama, fired clays can be used on their own, mixed with grit for faster draining soil or mixed with 10%- 20% bark if an organic component is required for greater water retention (while still retaining good drainage properties). A wide number of fired clays are available; I would recommend contacting other enthusiasts in your vicinity for the names and availability of different baked and fired clays that you can source locally.

Catlitter (also jokingly known as 'Kittydama') or Diatomaceous Earth or 'Diatomite'. Some specific catlitter products are made from fired clays and seem to provide an almost perfect blend of water retention, drainage and aeration for all plants and specifically bonsai. If the correct catlitter product is used, it will remain stable for a great number of years and so is particularly useful for coniferous tree species that cannot be bare rooted, or even, repotted annually. For anyone living in the UK, I would wholeheartedly recommend a number of easily obtainable products (as exact brand-names change every few years I will not list them here and instead would recommend visiting www. Bonsai4me.com for the latest up-to-date information). These fired clays have excellent properties as bonsai soil.

I have been using these catlitter for all of my trees for a number of years now and would not switch to anything else. As well as being very cheap, it is easily obtainable from most major supermarkets in the UK.

Over the 5 years that I have been using cat litter (high-fired clays) I have found that my bonsai have become considerable healthier, more vigorous and disease resistant and judging by the amount of correspondence I have received concerning similar products around the world, I am not alone!

Many Cat Litters are perfumed; the perfumes themselves should create no problems as they are quickly dissipated after contact with water. If in any doubt, watering the mixture a week before use will release most, if not all of any residual perfumes. Some products can also contain baking soda, this is

added by the manufacturers to neutralize odour. Baking Soda is far more 'stable' in the soil, that is, it will remain in the soil for longer than any perfume will. However, all of the research I have been able to obtain indicates that baking soda has actually been long used as a fungicide against mildew in roses and other members of the Rosaceae family (Hawthorns, Crab Apples etc). According to Cornell University research, the only plant damage associated with baking soda/Sodium Bicarbonate in tests, resulted from some foliage burn when the leaves were sprayed with a highly concentrated dose of Baking Soda. The Cornell testing also established that Sodium Bicarbonate does not increase the levels of Sodium in plant tissues, soil or run off water.

Sodium Bicarbonate is an alkaline substance, but in cat litter it appears to be in too small a quantity to affect the pH of the soil. My understanding is also that though Sodium Bicarbonate will neutralise acids it will not increase alkalinity. However, I do have to recommend that if using any brand of catlitter for the first time; check the pH of the soil. In the case of Tesco's 'Premium Lightweight' cat litter, all tests I have made have shown a neutral pH of 7.

SWITCHING FROM ORGANIC TO INORGANIC SOILS

Almost all deciduous varieties will tolerate the transition from organic to inorganic soils immediately; coniferous species, in particular Pines, benefit from the retention of some of their old soil which will contain mycorrhizae fungi necessary for health.

THE BEST SOIL MIX FOR BONSAI

There is no single soil mix that is best for cultivating bonsai; variables such as local climate and rainfall, personal watering regimes and individual tree species all contribute to variations in enthusiasts' soil mixes. Ultimately, experience of using different soil types and ingredients will shape your own particular preferences. It is recommended that in the first instance, find out the soil-mix that local enthusiasts are using and take it from there. I would always recommend that an inorganic soil be always used for the health and ease of cultivation of your bonsai.

'BONSAI SOILS' BOUGHT FROM NURSERIES AND GARDEN

CENTRES

Though it saddens me to say this, the vast majority of products packaged and sold as 'bonsai soils' at plant nurseries, garden centres and even many bonsai nurseries are next to USELESS for bonsai. Often these are simply peat/compost based soils mixed with some sand or grit and (as described previously) have a soil structure that is too water retentive, airless and generally bad for the health of your bonsai. Though there are of course knowledgeable outlets selling good quality soil products, these appear to be in the vast minority. Because you bought some ready-mixed bonsai soil from a nursery, does not necessarily make it suitable for the health of your bonsai.

Similarly, if you have bought a bonsai from anywhere other than a well respected specialist bonsai nursery that will care about the quality of the trees it is selling; do not assume that the tree is planted in a good soil.

FEEDING TREES GROWING IN INORGANIC SOILS

If there is one thing that seems to worry enthusiasts about switching to an inorganic soil, it is the lack of 'proper' organic and a 'lack of nutrients'.

Firstly, I and many (most) experienced enthusiasts have switched to largely inorganic soils (such as catlitter, baked clay, Akadama, Turface etc) entirely and have been using these products for many years. The reason for switching to inorganics is purely for the increased health, vigour and strength that it provides a bonsai (or any plant for that matter). Be confident that switching to inorganic soils is widely considered 'best practice'. Bonsai grown in an inorganic soil do not need any special fertilising regime or special ingredients to keep them healthy.

There are of course some differences between compost-based organic mixes and inorganic mixes. Inorganic soils contain little or no nutrients, however, just as equally, compost/peat based organic soils only provide very limited nutrients to a bonsai and these are quickly depleted within a bonsai pot. Organics are able to retain more nutrients better than inorganics (after feeding), but this is not necessarily a good thing. Trees growing in inorganics need (but can also take without any danger of root burn) more fertiliser than those growing in an organic soil. Many enthusiasts see this as being

advantageous though as it allows the enthusiast to feed their bonsai heavily to encourage better growth, health and faster development. That an organic bonsai soil can hold nutrients for a little longer than an inorganic bonsai soil is hardly advantageous, as bonsai growing in organic soils still need to be fed regularly! With my inorganic soil mix, I am able to feed heavily and use (as many do) a slow release fertiliser and a fortnightly full-strength balanced plant fertiliser simultaneously throughout the growing season.

August 2007: Appearance of the rootball after lifting it out of the bonsai pot.

After gently lifting the rootball of the Trident maple out of the pot, I could examine the roots.

While it is of utmost importance to only root prune a bonsai at the correct time of year, normally in early spring as the new buds begin to extend into leaves, a tree with an established rootball can be gently eased out of the pot to have its roots inspected at any time

The tree had healthy roots however they were all growing around the base of the pot and not within the soil itself; another indicator that the soil was airless and too water retentive.

The thin white roots in the upper layers of the soil are those of the liverwort. Without bare-rooting the Trident, it would be impossible to remove all traces of Liverwort as any roots left in the pot will re-grow.

So at the earliest opportunity I would need to bare-root the tree and remove all of the old organic soil (and along with it, the Liverwort) and

replace with a good quality inorganic soil. With a well aerated inorganic soil, the roots would grow throughout the soil and not just head down to the bottom of the pot as they can be seen to have done in these images!

As it was August when I acquired the bonsai, it was not possible to carry out a bare-rooting and 100% soil change; this would have to wait until the following spring.

However, I was able to safely remove a large amount of the surface soil without disturbing any of the roots. Not only did this remove all of the liverwort but I was able to remove a large amount of liverwort roots.

August 2007: Cleaning the root surface.

The removal of this surface soil meant that when I put the tree back into its pot I was able to introduce some inorganic soil where the old soil had been removed, as well as place the rootball on top of a shallow bed of fresh soil at the base of the pot to improve drainage.

This is a very useful technique, as a temporary measure to improve the growing conditions of all bonsai that are either completely root-bound or growing in poor soil (or both). By introducing good quality soil in and around the roots, the bonsai is given some well drained and aerated soil that it can immediately colonize with new roots. As long as none (or very few) of the existing roots of the bonsai are disturbed, there is no threat to the health of the tree.

In the following spring of 2008, I was able to repot the bonsai, upon inspecting the rootball again; new roots had already completely colonized the inorganic soil.

This time I was able to bare-root it to remove all traces of the old organic

soil. As the soil that I introduced was a high-fired clay that will not break down, I will probably never need to bare-root the very centre of the rootball again.

October 2007: The Trident Maple showing autumn colours in my garden following its first styling.

October 2007: the Trident bonsai shows its autumn colours as the leaves fall and is an impressive sight. Now that the leaves had started to fall, I was able to study the trunk and branch structure clearly for the first time.

The image above shows the new front I decided on for the bonsai; the trunk has been turned approximately 45º clockwise.

From this direction, the trunk is more attractive; rather than looking simply like a straight log of wood as it did before, the trunk line now gently moves from one side to another until it finishes at the top of the tree. These bends and curves create visual interest in the trunk and are known in bonsai as ‘visual movement’.

Using this new angle as the front of the bonsai also means that a small area of negative taper in the trunk cannot be seen any more

The trunk base no longer looks as wide; however, it does look more impressive. (There are occasions when enthusiasts will automatically choose the widest view of the trunk for bragging rights, but personally I believe in quality and not quantity).

A pot was then ordered from my favourite potters Erin Bonsai to be ready for repotting in the spring of 2008. As Trident Maples have a wide range of beautiful foliage colours throughout the year along with the grey/beige of the trunk. This needs to be taken into account when choosing a glaze colour for the pot in which a Trident Maple is planted.

Off-whites and creams are quite neutral colours, which harmonise nicely in winter, with the trunk and bare branches and they never overpower the pale greens of the spring foliage. Also, subtle glazes help to emphasise the stronger summer greens and autumn orange, gold and yellows.

By February 2008, Vic Harris of Erin Bonsai had built a 50cm wide rectangle pot for me, and I was ready for the spring buds to start to extend so I could plant the tree in its new home!

March 2008: I repotted the bonsai into a new rectangular pot from Erin Bonsai.

March 2008: After repotting the Trident bonsai into its new pot from Erin Bonsai.

March 2008: The author pictured with the Trident after repotting. At 75cm in height it is an impressive size!

The roots were cleaned of the old organic soil and root-pruned hard. Trident Maples have very fast growing roots and require root pruning every year or at least every other year or they quickly become root-bound, and this can slow down top growth of the foliage mass considerably.

In the image above, the styling of the previous October can be considered more clearly.

As I tend to do with my bonsai at least once in their development, nearly all of the branches have wired and positioned precisely as I wish to see them. This is where the Art, as opposed to the horticultural care comes to the fore in bonsai. How you prune the branches and how you place the branches greatly influence the overall image of the tree.

In this case, I wanted to create the image of a large wild tree growing in isolation in a meadow. While the trunk and roots are powerful and majestic, they are juxtaposed with a light, airy foliage mass consisting of 100's of branches that are not competing with nearby trees for the light and are able to grow naturally.

A few areas of my styling worth noting are that while the tree had been styled by its previous owners with definite 'clouds' or 'layers' of foliage like those seen on a Pine, I have 'opened up' the branches, so they grow as a deciduous tree in the wild would. Though the lowest, and therefore oldest and 'heaviest' branches have been given a subtle downward path, the majority of the primary branches and nearly all of the secondary branches have been wired, so they grow slightly upwards.

And finally, as I do when styling all bonsai branches, I have tried to remove all straight branch sections by adding bends or 'movement' to them. Ramrod straight branches can often look artificial and juvenile.

My aim is to create the image of real deciduous tree in the wild, not to try and copy the image of a pine bonsai.

BONSAI APEX-BUILDING

The very top branches of a bonsai are known as the apex. In a mature field-growing tree and a bonsai, the apex is seen to be a broad dome of foliage above the rest branch structure. Whilst building and shaping the branches of a bonsai is frequently described in bonsai literature and is therefore reasonably well understood, apex building, or the formation of the apex, is rarely described and can be difficult to style.

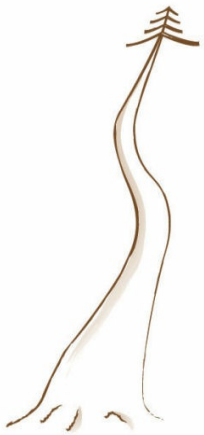
WHAT IS THE APEX?

It must be understood that the apex is a general term that describes the upper branches and silhouette or shape of the top of the tree. It is part of the branch structure of the tree and not a separate entity that just sits on top of the trunk. A common fault in bonsai styling in past years has been that the apex has been visibly separated from the rest of the branch structure by a visible gap or band in the foliage. Fortunately, this does seem to be a thing of the past!

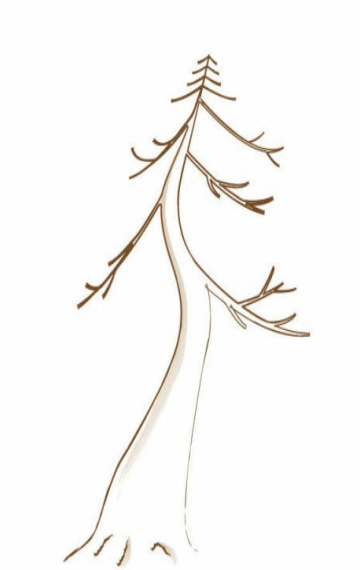
One thing that nearly all bonsai apices have in general is a broad, dome-shaped apex. This is reminiscent of a mature tree; a narrow, pointed apex is normally illustrative of a young tree and should be avoided in bonsai. Apex building should depend on whether the bonsai is deciduous or coniferous, and the style of the bonsai; whether it is naturalistic (realistic) or abstract (styled like a Pine).

BUILDING THE APEX OF A CLASSICAL, ABSTRACT OR 'PINE STYLE' B

This category contains deciduous and broadleaf trees structured in the classical or abstract style. That is, they have largely near-horizontal branches with clearly defined foliage pads.



For trees in this style it is usual to build what is described by Western Bonsai pioneer John Naka as, a 'tree upon a tree'.

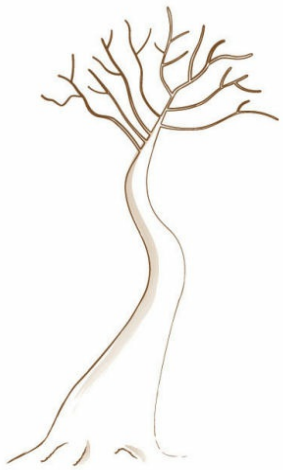


However, this abstract-style apex cannot be used on bonsai styled with natural, upward growing branching.

BUILDING THE APEX OF A NATURALISTIC, CONTEMPORARY AND NATURALLY-STYLED DECIDUOUS BONSAI

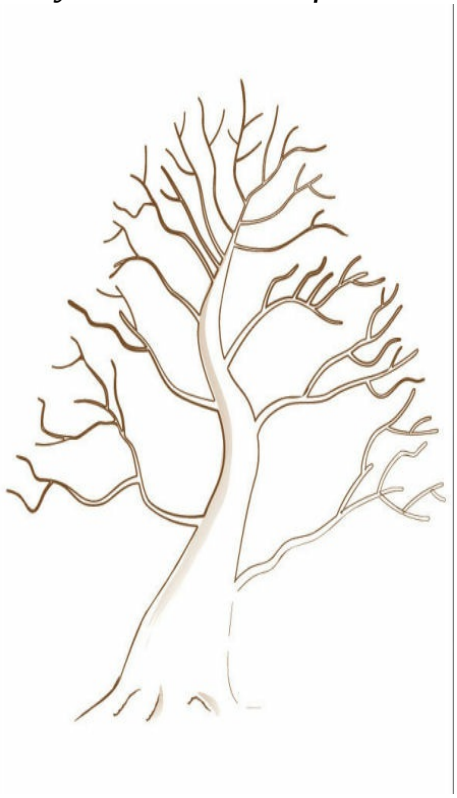
This category contains deciduous and broadleaf trees that are naturalistic, that is, they are styled and structured to look like a natural deciduous or broadleaf trees.

The uppermost branches grow at upward angles and fan out above the top of the trunk to create the apex and the crown of the tree.



The trunk does not have to reach the very top of the bonsai either; many deciduous trees will have a trunk that reaches just 2/3 (or even less) of the

overall height of the tree before separately into a number of smaller 'trunks' or heavy branches that form the apex.

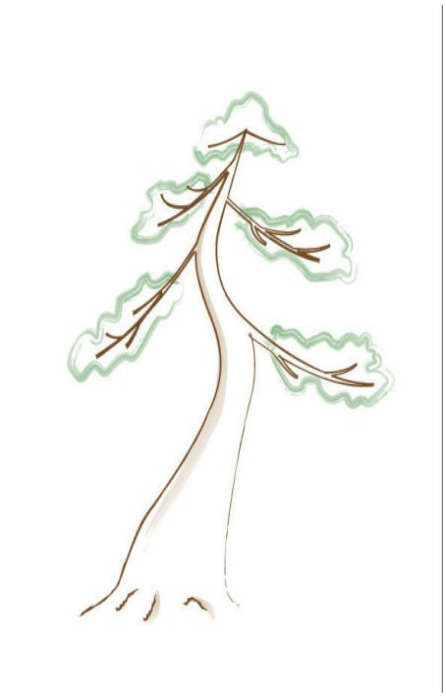


The natural apex style can be used with success on classical, abstract and even 'Pine Style' bonsai.

CONIFEROUS BONSAI

This category includes Pines, Junipers, Spruce and similar species that are naturally seen growing in the 'Pine Style' with horizontal branching and clean foliage pads.

Unlike deciduous species that are in the 'Pine Style', the apex should be built with less (primary) branches growing from the trunk itself. One advantage with building the coniferous apex is that the branches are never bare and the structure is never revealed.

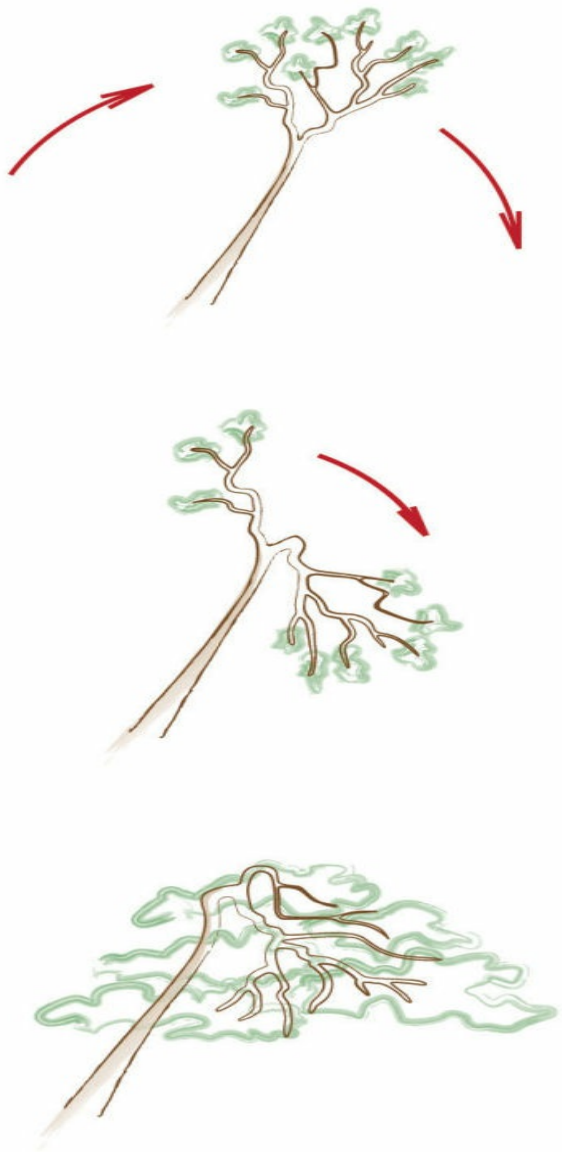


The easiest way to build a coniferous apex is using the 'T-bar branch'. One or two branches at the very top of the trunk are allowed to grow as a (T) bar-branch. Smaller secondary shoots and foliage is encouraged to grow along the length of the T-bar branch to create a dome of foliage.

The apex of a coniferous tree should not be built from the wheel-spoke branches that are often seen growing on a pine. An apex built this way will suffer with inverse taper at the top of the trunk and will tend to have a bald patch in the middle of the apex.

A more satisfying and possibly more contemporary approach is to use a small group of secondary branches near the top of the trunk and 'layer' them into a pad of foliage; each individual branch and the overall foliage pad must be kept lighter than any other branching on the tree. This method of

‘layering’ the apex of a coniferous tree is very often seen used on deadwood or heavily carved trunks and bonsai that are styled using only one or two primary branches.



THE SHAPE AND DIRECTION OF THE APEX

The apex should have implied direction that reflects the implied direction of the tree.

The apex has a roughly irregular triangular shape - that is, one side of the rounded apex slopes more gently than the other. The side with the steeper slope is said to indicate the direction that the tree is facing (toward the sun).

This direction is nearly always facing the same direction as the bonsai’s first branch. That is; if the first branch faces left then the apex should also

face left.

The apex of a spreading coniferous tree with the foliage forming natural 'layers' or 'clouds'.

The apex of a spreading deciduous Oak tree growing in a field. The main trunk begins to divide halfway up the trunk and the apex consists of branches or 'secondary' trunks, some that start quite low down on the tree. Note that only the very lowest branches on this tree grow horizontally or downward despite the tree's age.

A large Sweet Chestnut photographed during the summer. Again it has an apex formed by several major secondary trunks and branches.

It is noticeable that this tree has distinct growth towards the left, towards the Sun and away from several large trees that are growing to the right of it.

This Willow growing alongside the River Ouse in Bedfordshire has two distinct apices that make one larger whole apex.

Studying the direction that the trunks and main branches have grown it can be seen that the strongest source of light is towards the left (as the tree is not overshadowed the tree is almost certainly facing the South and the mid-day sun).

This superb Oak photographed in a field in Norfolk is an excellent

example of both movement and direction in a deciduous tree, and of deciduous tree apex building.

Three separate apices have formed naturally and together create one large crown to the tree.

June 2008: 3 months later and the bonsai is in full leaf and in vigorous health.

June 2008: the tree seen from the left side. Notice the thick root at the back of the tree that I had to severely shorten during the tree's spring repotting.

Acer buergerianum is vigorous fast growing species and I feed this one with slow release fertiliser three times during the growing season and a fortnightly quick-release liquid fertiliser. To encourage maximum growth.

It is only when comparing images of the bonsai as it was bought in August 2007 and in June 2008 that it is possible to see how many improvements can be made to a 'finished' bonsai in just 10 months.

Notice the improvement in the colour and lustre of the leaves thanks to improved soil conditions and a heavy feeding schedule. It is also possible in these images to see compare how I have avoided trying to create 'pads' or 'clouds' of foliage.

I have also subtly altered the silhouette of the tree creating a more mature rounded shape and a wider crown. The bonsai has begun to look like a real tree and not just a bonsai imitating a bonsai.

One of the many highlights of the new growing season is the opening of the new spring leaves in April and early May.

Other than a simple pruning and some light wiring during the winter, no work has needed to be done on the tree. This is a time to simply enjoy the tree!

April 2009: Seen from the front in the bright spring sunshine.

April 2009: The delicate spring colours of the leaves contrast well with the muscular trunk.

April 2009: The Trident bonsai with its new spring leaves.

April 2009: A close up of the powerful roots at the trunk base (the nebari).

July 2009: Once the leaves of spring have hardened and changed to their summer green colour the tree can be defoliated.

Defoliation, or removal of the leaves, is a useful bonsai technique for increasing the ramification (or twig density) of the foliage mass, and as a side product decreases leaf-size.

The leaves are removed individually by cutting them off with sharp scissors leaving the leaf-stalk or petiole in place. This prompts the bonsai to issue a new foliage mass. If the bonsai is strong and vigorous enough, a new shoot containing a number of leaves will emerge from many points where a single leaf has been removed during defoliation, dramatically increasing leaf and twig density.

As the increased number of leaves will be supported by the same root-mass as the tree had in spring, each individual leaf will also be smaller. Such is the tenacity of many Acer buergerianum/Trident Maple bonsai; they can be defoliated twice in a single year. The image above shows the bonsai after its second defoliation of the year in late July.

Height of bonsai 30”/74cm
Trunk base diameter 8”/20cm

Looking up into the branches of the Trident Maple, spring 2010. Image courtesy of Claire Simpson.

Species Guide

Acer buergerianum/Trident Maple

Acer buergerianum, the Trident Maple, is grown in many parts of the world as a 'street' tree due to its tolerance of pruning, dry soil and air-pollution; these attributes also make it excellent material for bonsai culture. Native to Korea, China and Japan, Trident Maples can reach heights of 10metres or more.

In the UK, Trident Maples are the most difficult Acer species to locate. Rarely stocked in garden centres and tree nurseries, they are also unavailable to collect from the wild.

In the past Tridents have nearly always had to be sourced from bonsai nurseries as imported stock but recent tightening of import laws has made them even more difficult to locate. (Note that a very similar but much more easily available alternative to the Trident Maple is the Field Maple/ Acer campestre).

Acer buergerianum differs from its Acer palmatum relatives by virtue of its 3-lobed leaves (as opposed to the 5 or 7-lobed leaves of A. palmatum). Leaves are dark-green above and blue-green underneath, turning beautiful shades of orange and red in autumn. New buds are a red/brown colour.

The bark is buff and a flake revealing a soft-orange under-bark in maturity, the bark becomes darker.

Trident Maples are a very vigorous species, particularly when grown in the ground and are very suitable for field growing to develop large trunks suitable for bonsai.

BONSAI CULTIVATION NOTES

POSITION

Full sun. Provide light shade for weak-rooted specimens during hot summer periods to avoid leaf-burn Thick trunked Trident specimens are often planted in relatively shallow bonsai pots that may dry quickly during the Summer; these should also be provided with some shade from the afternoon sun.

Roots have high moisture content and are susceptible to frost damage. Frost protection should be afforded when temperatures drop below -5°C. Avoid organic/peat based soils as the cycle of water-logging and frost can damage the roots.

FEEDING

Feed once a week for the first month after leaves appear in the spring to help strengthen new growth. Thereafter feed every two weeks.

REPOTTING

Annually as buds extend. Use a very free-draining soil mix. Tridents have very strong and vigorous root-growth that is very suitable for the creation of good trunk-flare and nebari. Tolerant of aggressive root pruning.

PRUNING

Allow new growth to extend to 2-5 leaf pairs/nodes and then prune back to one or two pairs of leaves (depending on the position on the tree) throughout the growing season.

Keep on top of the most vigorous shoots in the apex and upper branches to stop them becoming too thick and weakening the lower and inner branches. Continued pruning of these apical areas will distribute vigour throughout the tree.

Prune all branches back hard after leaf-fall or in late winter. Removal of large branches or trunk-chopping should not be carried out in early spring as this can cause excessive sap-loss.

Trident Maples are very suitable for defoliation and leaf pinching techniques. With defoliation and increased ramification of the branches, leaf-size can be reduced dramatically.

WIRING

Wiring should be carried out with care as bark marks easily and branches thicken quickly.

Trident Maples are very easy to approach and thread graft new branches and roots. However, given their tendency to back-bud easily and continually, it can be worth waiting for an appropriate bud to start developing before resorting the grafting.

PROPAGATION

Easy to propagate from seed; sow outside as soon as ripe. Air-layer in late-Spring. Take hardwood cuttings in winter, softwood cuttings in summer.

PESTS AND DISEASES

Aphids, caterpillars, scale insects, mites and leaf-scorch.

STYLING

Suitable for all forms except formal broom with single or multiple trunks in all sizes. Acer buergerianum have powerful roots and are suited to root-over-rock forms.

CHAPTER 9

JAPANESE MAPLE

Acer Palmatum/Japanese Maple

Progression Series

Acer palmatum are one of the most beautiful trees there are for the garden with their graceful growth habit and delicate 5-lobed leaves.

Across the range of the species, there is significant variation in growth habit, leaf size, leaf shape. Spring, summer and autumn colours, are rarely short of spectacular creating stunning displays of reds, oranges, pinks and yellows.

As bonsai, these characteristics can be captured in a small pot. They are also very popular due to their ready ability to respond to most bonsai techniques; their delicate appearance belying a strong and resilient nature.

In May 2005 I found this Acer palmatum bonsai on E-Bay, it had quite a fat trunk but due to its ugliness, no-one seemed interested in bidding on it, so I decided to pick it up at a ridiculously low price of just £60.

May2005: Offering image of the tree. Its height was around 16”/40cm.

When I received the tree and studied it, I decided that the best front might be towards the left of the original front shown in the auction picture.

May 2005: After receiving the bonsai, I was able to study it from every angle and quickly decided on a new front for it.

My decision was based on a number of factors; while I wanted to try and display the bonsai so that its trunk and trunk base could be seen at its best, I also had to consider which way the tree naturally leant (a bonsai should not lean away from the viewer) and the position of the existing branches.

If the best front for the bonsai left me with a poorly positioned branch would I be able to remove it and still produce a cohesive design? If a branch (or branches) were missing, would I be able to wire a neighbouring branch into position or grow a new one?

As with all bonsai I purchase, I inspected the rootball. As with many Korean imported trees, this Acer palmatum was hopelessly root-bound though the soil itself was, thankfully, good.

If I wanted to develop the bonsai faster, I would need to allow the roots extra room to grow until I had an opportunity to bare-root and work the roots during the early spring of 2006. So I lifted the tree out of its ceramic pot and potted it up into a larger mica pot to allow some root growth for the remainder of 2005.

June 2005: It is common to purchase bonsai that have a pleasantly shaped silhouette that hides a pretty poor branch structure.

June 2005: I steadily worked over the primary branches removing branches that were too heavy, too straight or both!

June 2005: I also reduced the number of branches growing from any one point, to a maximum of two.

Knob cutters were used to make clean slightly concave cuts that were then sealed with wound sealant. At this stage, my only purpose was to introduce some order to the primary branches, what remained of the secondary branches would be dealt with in dormancy.

This typically occurs because the tree has been repeatedly pruned by the grower and seller but has never actually been styled.

Given how time-consuming it is to style, prune and wire a bonsai it is understandable that a vendor will rarely go beyond giving his stock a quick ‘haircut’ every now and then.

But, as the new owner of a bonsai, a decision must be made. Do you keep the bonsai as it is; something that is pleasant to look at while in leaf but a bit of a turkey during the winter months? Or do you work on improving the design of the tree which can be a longer-term project, entailing a rebuild of some or all of the branch structure during which time the bonsai looks considerably worse?

My personal preference is for a bonsai that not only looks good during the growing season but also during dormancy when the leaves have dropped. In order to achieve this year round beauty I would need to rebuild the branch structure during which time the bonsai would not look its best, but hopefully the results would be worth the wait.

As the maple had many heavy branches that were either too straight, had

long internodes or were growing at poor angles (but too thick to be bent with wire), I was faced with some major surgery.

June is a good time to prune heavy branches (that will leave large scars) on many deciduous trees, as the resulting wound heals quickly, and so I started work immediately.

May 2005: With the hard pruning finished and all of the ugly, faulted and superfluous branches removed.

Although it was not possible to consider the whole structure of the tree while still in leaf, I removed the heavy branches that I already knew had no future on this tree.

After removal of over half of the branches and foliage, the tree did not look pretty. Pruning out 'faulted' branches is not easy because the resulting branch structure can look very ugly (as shown above), but this is only a short-term setback and the ultimate reward of a well designed bonsai are worth it!

March 2006: Ten months later, during the spring, I potted the tree into a new pot from Erin Bonsai.

Just 10 months later and the bonsai is starting to shape up again. The image above shows the tree after repotting, further branch pruning and wiring in March 2006.

As this was the first full repotting of this tree by myself, I bare-rooted the bonsai entirely. It took a long time to separate the encircling roots that had filled the previous bonsai pot, but, after two hours, I had a pleasant surprise when I realised that the tree had a great nebari (trunk base) that had been previously hidden under the soil.

March 2006: A close up of the newly discovered trunk base and nebari.

Unfortunately, the best side of the nebari was towards the previous back of the tree and not the front that I had already starting developing a new branch structure for.

So the tree was turned 180° to show the nebari to its best effect. The change in the tree-front did mean I had to change my previous plans for the branch structure.

Sometimes when designing and developing a bonsai, unexpected events

can require you to think on your feet and change your plans!

Some work was needed on the new nebari; two crossing roots (on the right hand side) have merged together and created an ugly ‘elbow’ protrusion. Rather than remove this piece of root during the spring, I waited until midsummer when I knew that its removal would prompt quicker healing and closure of the resulting wound.

September 2006: 6 months later the resulting scar has started to heal.

The wound is very prominent at present and will take 3-5 years to heal over (assuming strong and vigorous growth in the tree) but as with the branch structure of this tree, an ugly fault is often best addressed immediately rather than ignored.

March 2006: My final work on this tree for the spring 2006 was to address the noticeable lack of branches in the upper section of the trunk.

Without any growth emerging from this area, the apex looked a little too much like a small tree perched on top of the rest of the bonsai. Unfortunately, this section of trunk looked unlikely to ever produce the buds necessary to grow new shoots and therefore a branch, so I decided to thread-graft a new branch into position.

Thread-grafting is a very straightforward technique and by far the easiest way to graft in bonsai. (For more information on thread-grafting, please see the following pages).

A small hole was made through the trunk, and a long shoot was taken from a nearby branch and threaded through the hole.

Acer palmatum respond to thread-grafting very quickly and this branch had successfully grafted within 18 months.

THREAD GRAFTING FOR BONSAI

'Free' grafting, where the new branch or shoot is made using a scion completely removed from the donor plant prior to grafting, is a difficult technique to master. Free grafts have a failure rate, even when carried out by experienced nurserymen; for the amateur, the failure rate can be high.

Hawthorn with a thread-graft. The new branch is being allowed to grow freely to encourage it to thicken as quickly as possible.

Alternatively, approach and thread grafting techniques utilise a scion to make a new branch or shoot that is still attached to the donor plant (very often the same plant that also receives the graft) and the scion is not separated from its donor until it is has successfully grafted in its new position.

The fact that the scion is supported by its donor until the graft has taken makes approach and thread-grafting much safer, even for the beginner.

Before opting to graft new branches onto your tree, consider whether it would easier and quicker to simply hard prune your bonsai to prompt budding from the trunk during the following spring.

Very hard pruning of most deciduous trees during the winter will encourage back budding from the trunk. If the branch structure of your bonsai is already well developed and ramified, and hard pruning is not an option, thread or approach grafting can be a very useful option.

THREADGRAFTING

Thread-grafting is the easiest way of attaching new branches where they are missing on a bonsai.

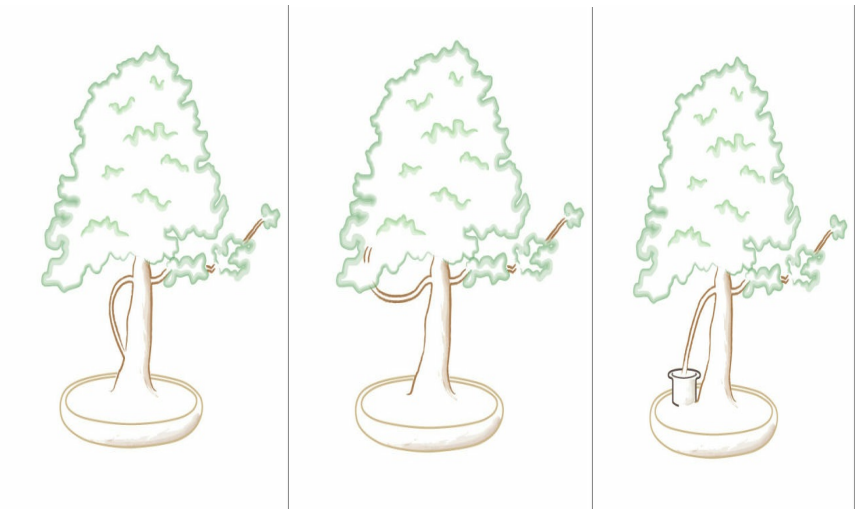
The basic principal of thread-grafting is that a hole is made through the trunk (or another position where a new shoot is needed); the scion (new

shoot) is then threaded through the hole and fixed into position. As the scion and the trunk continue to grow they swell and are forced together; eventually grafting together. The only possibility of the graft failing is if the scion is separated from the donor too early before it is successfully grafted into its new position.

Though it may seem harmful to the tree, drilling a hole through the trunk only damages a small area of live wood at the entry and exit points.

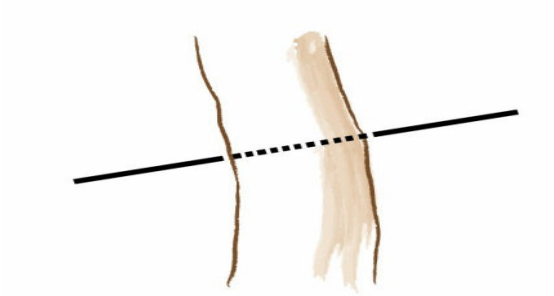
The graft does look a little ugly while the actual graft is taking place and will need to be in position for one to two years. However, afterwards, the resulting wounds are minimal and very hard to detect.

This method is suitable for all deciduous and broadleaf trees but not for coniferous species where complete defoliation of the scion will result in its failure.



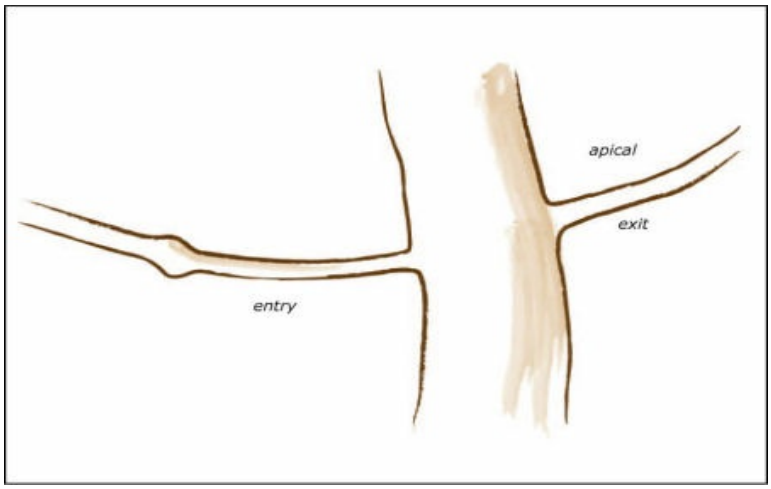
Prepare the tree to be grafted by allowing a number of long shoots to develop. Suitable shoots to be grafted (used as the scion) will be long and supple enough to be bent over and threaded through the trunk. The scion can be from the same tree or from another plant growing in a different pot. However, for the scion and the tree to be grafted, they must be of the same genus, i.e. an Acer and another Acer or an Elm and another Elm. Theoretically, thread grafts can be made at most times of the year but midsummer is best as growth of the scion and healing of the graft will begin immediately and strongly.

Remove all leaves and petioles (leaf stalks) from the scion branch. Take great care not to damage the tiny buds in the leaf axils as these will be required to leaf out when the graft has been made.

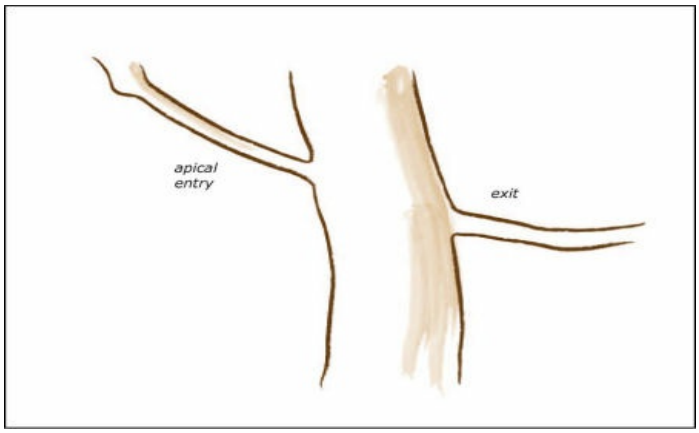


Drill a hole through the trunk; it is safest to use a thin drill bit to make a pilot hole followed by progressively larger bits until the hole through the trunk is very slightly wider than the scion shoot to be threaded. Though too large a hole will increase the amount of time it takes for the thread graft to successfully take, too small a hole will cause damage to the scion or the new buds on the scion.

Start the drilling from the exit side of the trunk so that the final position of the graft will be in exactly the place you intend the new branch to be. The position of the entry hole does not need to be precise. However, bear in mind that once the graft has taken and the donor side of the scion is removed, a small scar will be left. For this reason, try to make the entry hole at the back or side of the trunk where it will be out of sight of the front, if at all possible.



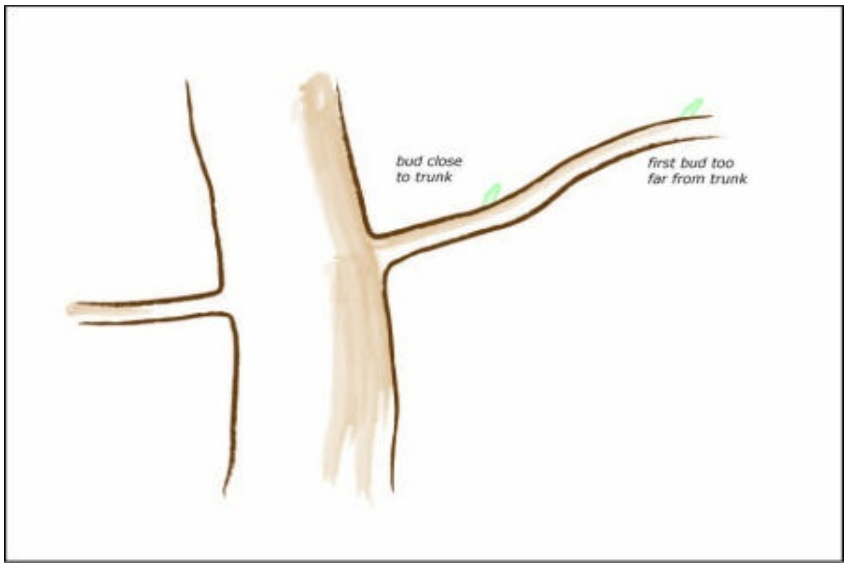
Though not essential, try to make the exit hole higher than the entry hole. The scion shoot will still be apical; if the shoot faces upwards; the side to be the new branch (at the exit of the hole) will bud out and grow more strongly than the entry side.



If the entry side is apical, new shoots on this side will have a tendency to grow more strongly and will need to be removed to make sure the threadgraft is able to grow strongly.

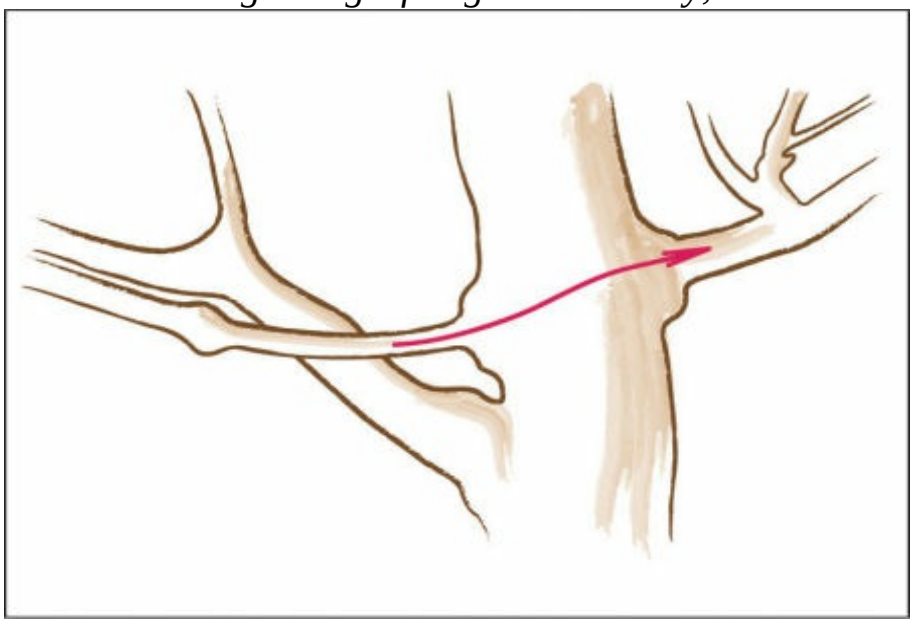
It is always important that the threadgraft is encouraged to grow as strongly as possible; the faster it grows, the sooner the branch thickens and the graft takes.

Thread the graft through the hole you have made, slowly and carefully. Particularly with soft-wooded shoots, try to pull the shoot through rather than push it, if possible. This helps to stop the shoot buckling as it goes through the hole.



To ensure the new grafted branch will have a short first internode, position the graft so a bud (node) is a short distance from the exit hole. Leaving a long distance to the first bud will mean that in the future, the first secondary branch will be a long way from the trunk.

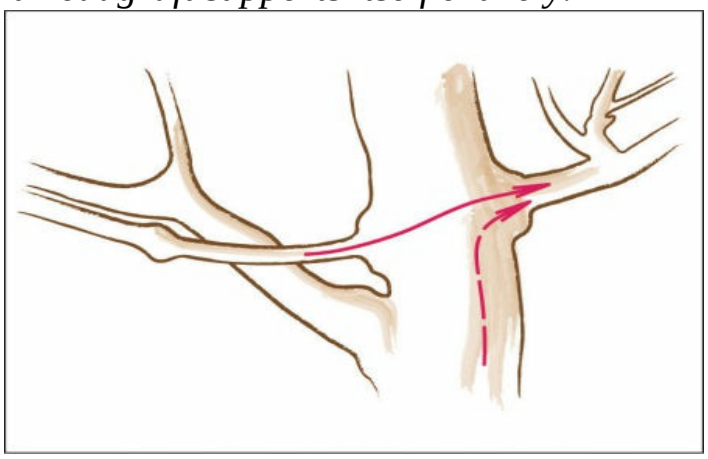
To fix the graft in position, insert a thin piece of wood (from elsewhere on the tree for instance), into the hole alongside the threaded shoot, so it is firmly wedged in position. If the threadgraft is able to move within the hole, the union will take longer to graft together. Finally, seal with cut paste.



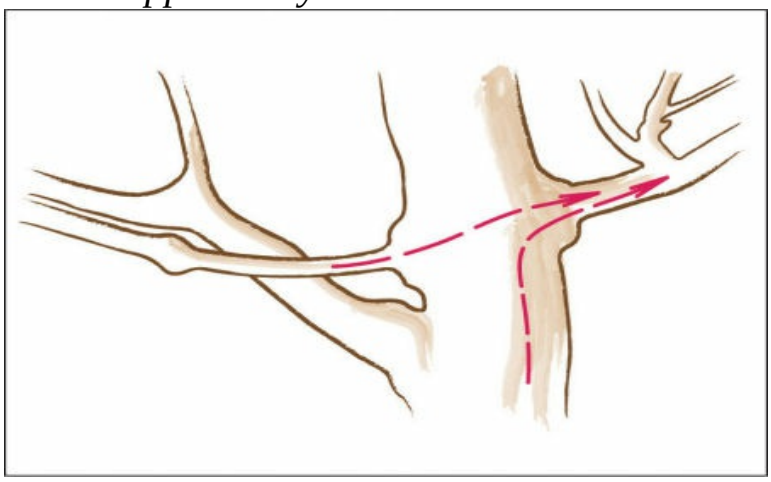
Encourage strong growth of the threaded scion. Feed the tree well to ensure strong growth. Remove any new growth on the entry side of the thread graft to encourage maximum growth on the exit side. Do not prune the threadgraft as this will slow thickening. There is no reason why the new

branch cannot be gently wired if necessary.

At first the new threadgraft supports itself entirely.



As the graft and the graft hole thicken, their cambium layers are forced together and start to merge. As they merge, the threadgraft begins to be supported by the trunk as well.



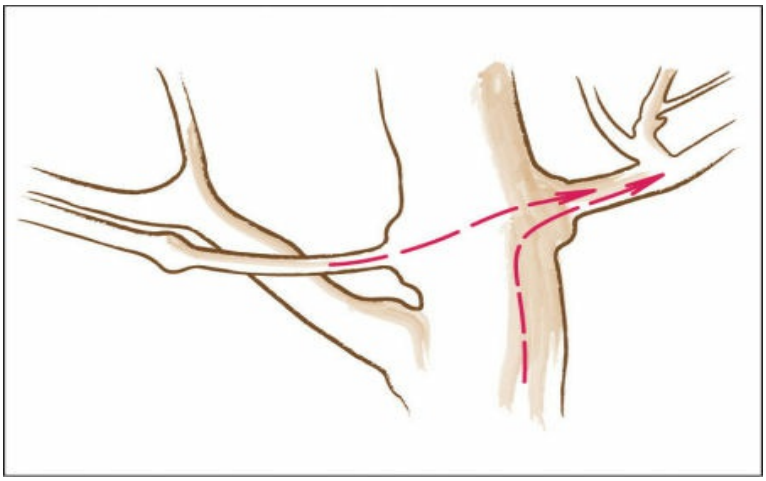
With the extra energy from the trunk, the exit side of the scion starts to grow and thicken faster than the entry side, eventually producing a pronounced increase in diameter. This indicates that the scion is being fully supported by the trunk in its new position and can start being removed.

A successful threadgraft on a Hawthorn.

A successful threadgraft on an Acer palmatum 'Bloodgood'.

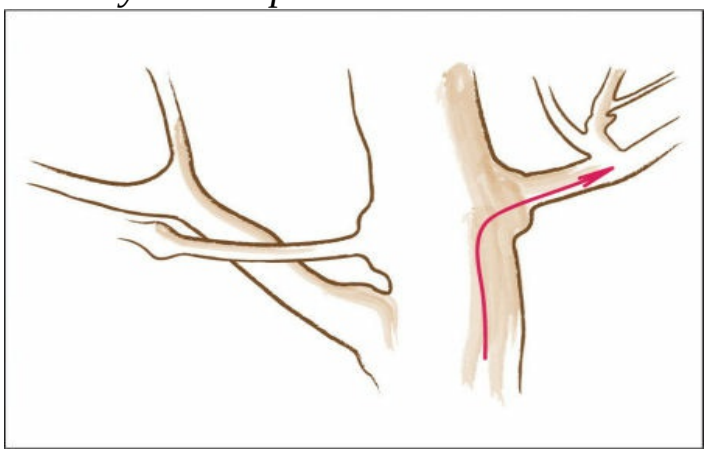
SEVERING THE THREADGRAFT

The amount of time for the scion to reach the stage where it can be severed depends on many factors. Some species take more quickly than others, in as little time as 2 or 3 months for Ficus species (if the graft is made just before a strong flush of growth), or 2 growing seasons for slow thickening species such as Hawthorn.

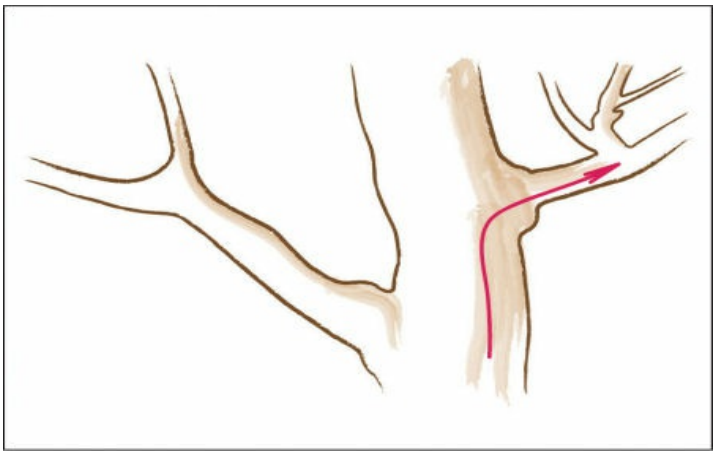


Timing of the removal or separation of the scion; it does not particularly matter at what time of year the threadgraft is separated once the threadgraft has taken but I prefer to carry out this work during the growing season while the tree and grafted branch are active and able to respond to the changes in sap-flow.

Do not detach all of the redundant side of the graft at once; the scion will still receive a little energy and be supported from the entry side of the branch. Detach the scion from the parent plant but leave a length of the donor branch in position so that the scion can slowly become accustomed to being entirely supported by its new parent trunk.



Over the course of 3 or 4 weeks, slowly shorten the donor side until it is finally removed.



Finally, the old entry hole can be pruned flush to the trunk and allowed to heal.

FAILURE OF A THREADGRAFT

Threadgrafts are most likely to completely fail if enough time is not given for the two cambium layers to join together. It is important to be patient.

There are occasions where the threadgraft is unknowingly separated too early and the leaves of the new branch droop and/or fall. This can also occur if the donor side of the thread graft is reduced in length too quickly.

In these cases, do not assume that the new branch will fail completely. I have had instances where a newly separated branch has lost its leaves but has already grafted just enough to slowly recover and issue a new set of leaves in the future.

September 2006: There are many improvements that can still be made to this Japanese Maple bonsai in the future. However, its appearance has improved in a very short time and it has already recovered some of the beauty it lost just over a year ago when the rebuilding process was started.

September 2006 with only a few weeks before the end of the growing season.

Now that the basic branch structure has been rebuilt using a combination of wiring the existing branches, growing new branches and thread-grafting, my attention turned to increasing the ramification ('twigginess') of the foliage mass to increase its density and to start reducing the leaf-size.

November 2007: Just over a year later; with the leaves having dropped in autumn, the branches were once again naked, and it was time to prune and wire the bonsai.

November 2007: After pruning and wiring the Maple during the autumn.

After a growing season where the new shoots had been repeatedly pruned back and the tree defoliated in late spring, the ramification has greatly increased. Out of leaf, the contrast of the numerous tiny new tertiary branches against the thick trunk and spreading surface roots create the impression of a tree much larger than 35cm in height.

Note that the first branch to the right was relatively empty of fine twiggy growth; I had previously decided that this branch needed to be much thicker and more powerful and so in order that this could be achieved, unlike the rest of the bonsai, it was allowed to grow freely throughout 2007.

August 2008: After another growing season of repeated pruning and a total defoliation in late spring.

As may be noted, the first left branch has also been removed, this has allowed me to turn the bonsai a few degrees anti-clockwise (the branch would have otherwise been facing directly forward at the viewer) to show the nebari to its best effect. Work is still needed on the first (right) branch to increase leaf mass.

Leaf-size had been reduced by over half and now provides a dense canopy. To help keep leaf-size small the tree is always placed in full sun, even during the summer when temperatures can reach over 30ºC.

I have found that growth is far stronger and more vigorous and leaf-size is much smaller when Japanese Maples are placed in good light, despite the commonly offered advice that they should only be kept in shade or partial shade.

The only wind- or sun-burning I have experienced has been on Japanese Maples with weakened root-systems, either from growing in poor soils or from recent root-pruning. In both cases, the tree is unable to supply enough moisture to the leaves from the roots and leaf-damage does occur.

I should add that my experience is based on the light-intensity of the UK, those enthusiasts in hotter climates be warned!

October 2008: One of my favourite features of this species is its vibrant autumn colour. The leaves are such a mixture of intense reds, oranges and yellows that they seem to glow in the garden, even on dull and rainy autumn days.

October 2008: showing the intense colours of autumn. Final height of the bonsai: 14”/34cm, with a root spread of 6”/15cm.

Species Guide

Acer palmatum/Japanese Maples

Acer palmatum are deciduous small trees and shrubs, with opposing five pointed leaves, native to Japan, China and Korea. There are at present hundreds of varieties in cultivation. Palmatum species are separated from other Acer species within their genus by way of their 5 pointed leaves.

They are very popular for use as bonsai due to their ready ability to respond to most bonsai techniques, beautiful foliage and graceful branch structure.

Across the range of the species, there is much variation in growth habit, leaf size, leaf shape and spring, summer and autumn colour.

Varieties or cultivars with a green summer leaf colour tend to be more robust whilst red-leaved varieties (though arguably more beautiful) lack the same quantities of chlorophyll in their leaves and are weaker. Flowers and key-shaped fruit tend to be insignificant and easily overlooked.

One of the main problems with looking after Acer palmatum is keeping the very thin leaves free of blemishes as they are easily burnt by the sun and

wind.

JAPANESE MAPLE CULTIVARS

It would be difficult to describe every Acer palmatum variety or cultivar in detail; instead those most commonly used for bonsai are described below.

RED-LEAVED CULTIVARS USED FOR BONSAI

These include Seigen, Chishio, Deshojo and Purpureum. All have red leaves in summer. Seigen and Chishio have feathery leaves and bright orange red spring colour. Both of these cultivars have a naturally more dwarfed habit.

Purpureum and Deshojo have broader leaves and are blue/purple toned in comparison. All red-leaved cultivars are more susceptible to leaf damage in the spring (before the leaves harden) from strong sun, winds or frost. However, all will start to lose their red pigmentation if kept in deep shade for more than a few days. Red leaved varieties are naturally weaker and slower growing than green leaved cultivars as they lack the same quantities of chlorophyll in their leaves.

ROUGH-BARKED CULTIVARS USED FOR BONSAI

These varieties have an aged, rough textured bark, even at a relatively young age (5-10 years). Though there are a small number of Acer palmatum with this characteristic, the most vigorous and well suited to bonsai cultivation is the ‘Arakawa’. This has light green leaves that turn yellow in autumn.

DWARF CULTIVARS

There are a number of varieties of A. palmatum that have a naturally dwarf habit and are very suitable for bonsai cultivation. Most commonly seen are ‘Kiyohime’, ‘Kashima’ and ‘Yatsubusa’. All have naturally small leaves, shoots, branching and trunks.

With the majority of Acer palmatum varieties, it is necessary to build foliage density, but these dwarf cultivars have naturally dense foliage and

often need their leaves thinning to allow light inside the canopy.

Dwarf cultivars (particularly Kiyohime) tend to be basally dominant; unlike the majority of plant species, the apex is weak and less dominant than the basal/lower growth and branching. Strong lower growth needs to be kept in check to ensure that the apex does not weaken too much.

DISSECTUM VARIETIES

Varieties with dissected leaves tend to be slow growing and naturally weaker than other Japanese Maples. Many have a weeping or cascading growth habit. Obtaining suitable stock that has not been grafted is very difficult making. Dissectum bonsai are rarity.

BONSAI CULTIVATION NOTES

POSITION

The general advice is to keep Japanese Maples out of direct sunlight and strong winds throughout the year to protect leaves against sun and wind scorch. In the UK, I keep my healthy Maples out in full sun all summer however those in warmer climates should always err on the side of caution and provide protection during the hottest parts of the day and during the height of summer.

In all climates, good light in spring and autumn aids vigour and leaf-colour. In winter, protect against frosts below -10°C.

WATERING

Acer palmatum are very thirsty prior to new flushes of growth in spring and summer and will need additional water.

Japanese Maples that are dry at the roots are also far more susceptible to sun and wind scorch.

FEEDING

Feed weekly with high nitrogen fertiliser as soon as leaf buds open in the

spring to encourage strong growth and to strengthen leaves against sun and wind scorch. Withdrawing some early fertilising produces very short internodes and finer growth required on ‘finished’ or developed trees.

After the first flush of leaves have hardened off, feed fortnightly with a balanced feed.

Japanese Maples will tolerate heavy feeding regimes to encourage very vigorous growth and quicker trunk-thickening.

REPOTTING

Every 1 or 2 years as buds extend in spring until the tree is over 10yrs, then as necessary in a basic soil mix.

PRUNING

Unless extension is required to form new areas of foliage or branches, cut new growth back to one or two pairs of leaves following bursts of growth through the growing season. For trees that require short internodes, buds can be pinched out leaving 2 new opposing leaves as soon as they are visible, this will produce fine, twiggy growth with short internodes and also promote back-budding. Remove all growth with long internodes.

Leaf-cutting can be carried out in mid-summer, this results in smaller leaves, better ramification and stronger autumn leaf colour. However, defoliation should only be carried out on healthy trees, never in the same year as repotting, never 2 years running and never on weaker red-leaved varieties.

Hard-pruning and formative pruning should be carried out in autumn after leaf-fall (preferably within 1 week) or during the mid-summer semi-dormant period when wounds can heal very quickly. Never prune during spring as all Acer species have a habit of bleeding profusely, which can severely weaken the plant or even result in the loss of branches. Ensure all wounds are sealed.

For trees that are displayed for their bare winter silhouettes, summer pruning might be considered.

WIRING

Wiring can be carried out at any time from early-spring to late-autumn though each period carries its own advantages and disadvantages. Optimally, wiring should be carried out on bare branches before bud extension in spring, after leaf-cutting in mid-summer or after leaf-fall in autumn. At these points in the year, the branch structure is not obscured by foliage, and there is enough sap remaining in the branches to keep them supple.

Spring wiring should be carried out with care as the new buds can dislodge very easily and wire can quickly start to mark the bark after the rapid growth of spring. Trees wired after leaf-fall in autumn should be protected against heavy frosts as branches will not heal properly until the spring growth period. During the winter, branches become exceptionally brittle and can snap without warning, only very gentle wiring should be attempted.

PROPAGATION

Sow seed as soon as ripe. Air–layers are the principal source of propagation and should be carried out as soon as spring growth hardens off in May. Cuttings strike easily but can have a high failure rate and can take 2 or 3 seasons to grow vigorously.

PESTS AND DISEASES

Aphids, scale insects, caterpillars and viruses including Verticillum wilt. Plants weakened by lack of fertilising, poor root systems, repotting, under or over watering, lack of dormancy are more likely to suffer burnt leaves.

STYLING

All forms except literati in small to extra-large sizes.

ADDITIONAL INFORMATION

Some varieties of Acer palmatum have variations in growing area dominance. Shrubby varieties such as Kiyohime are basally dominant, and unless care is taken when pruning can have very sparse apices.

Suitability for very hot climates is questionable, in extreme summer temperatures there can be an endless struggle to keep the leaves in good condition or even intact on the tree. Acer palmatum also require a dormant period (winter temperatures of less than 10°C for at least 44 days). Trees can survive a few seasons without a dormant period but lose their vigour, and this can lead to their eventual demise.

Acer palmatum are very suitable for thread and approach grafting of new branches and new roots.

Avoid grafted nursery trees often seen for sale in UK garden centres (one Acer palmatum variety grafted on top of a more vigorous understock trunk). Only purchase grafted nursery trees grafted specifically for bonsai with a very neat graft low down on the trunk.

Advanced Techniques

Acer palmatum/Japanese Maples

This species guide is intended as an advanced supplement to the basic species guide.

The techniques discussed here are not necessary for the very basic care of Acer palmatum bonsai, but do describe the tree in greater detail and can be applied for the development and care of superior specimens of this species.

ORDINARY TRIMMING

Prune back to 1 or 2 pairs of leaves after new growth has reached 3, 4, 5 pairs (depending on position on the tree). Large individual leaves can be removed leaving the petiole/leaf stalk as and when necessary. Gradually these leaves will be replaced be smaller and finer foliage leading to a denser canopy. To thin the canopy and allow light to penetrate the canopy to the inner branches; remove growth close the trunk, leaves that fall beneath the level of a branch and any over-sized leaves.

DEFOLIATION

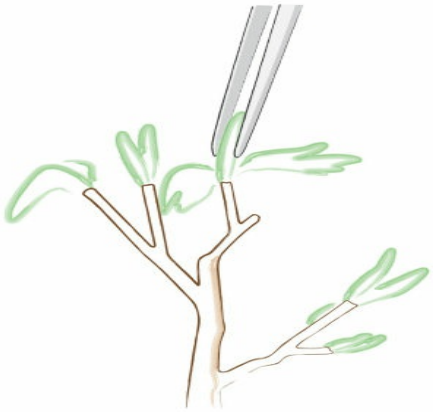
Defoliation can be practised at midsummer on healthy trees only. Weaker red leaved varieties should not be defoliated. Green leaved varieties respond well, but it is recommended that they not be defoliated 2 years in a row or in the same year as root-pruning The aim of defoliating Japanese maples is to increase budding (and therefore leaf and twig density), produce shoots with shorter internode length and lastly, decrease leaf size. Defoliating weak trees may not necessarily kill them but will not produce the desired effects and in some cases will promote the opposite effect; a small number of large leaves on branches with long internodes.

BRANCH PRUNING

Acer palmatum bleed heavily if pruned in early spring. This can be stemmed to a degree if the tree is root-pruned beforehand. I find it preferable to carry out general maintenance pruning and thinning of the branch structure in autumn after leaf fall. For the removal of large branches or trunk chops that will cause large wounds, mid to late summer is the best time for these jobs as healing and callus formation is rapid. Avoid making large wounds before midsummer as callus formation can be very poor and result in dieback of the area around the wound.

PINCHING BACK ACER PALMATUM

The main objective of pinching back Acer palmatum growth is to keep internodes short. Acer palmatum branches with long internodes have poor ramification and denseness of foliage. Creating branches (and trunks on young maples) with short internodes means that creating a tree with dense foliage much easier.



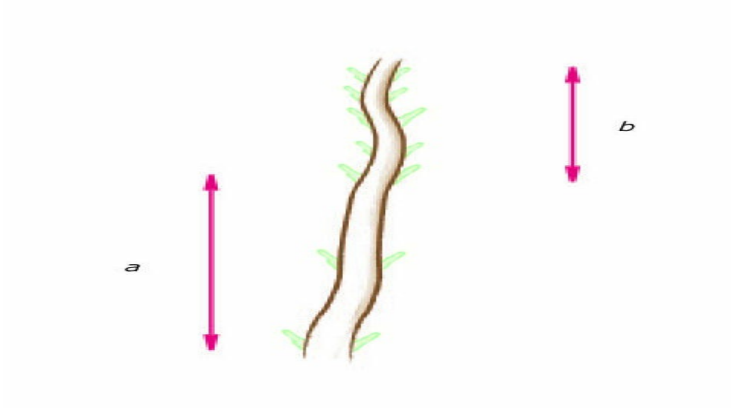
To achieve this objective, the first shoots in spring should be pinched out. The most vigorous shoots are the first to open in spring and so pinching out these will remove all shoots that have the potential to produce long internodes. With tweezers, open the newly opening leaves just as they begin to open and pinch out the central shoot. If you wait until the central shoot can be removed with the fingers, the internodes will have already extended too much. A second weaker budding will follow in 2 to 3 weeks time with shoots that have shorter internodes. The most vigorous shoots open first, by pinching the first crop of new buds to open; you help balance the trees' vigour throughout the whole tree. Energy and vigour is diverted to the slower, weaker buds on the insides and lower parts of the tree.

PINCHING BACK DWARF VARIETIES

The growth of dwarf varieties such as Yatsubusa and Kiyohime is usually quite balanced. However, due to their basal dominance, the strongest shoots are pinched back a little later than on ordinary palmatums and this encourages back budding on the interior of the branching.

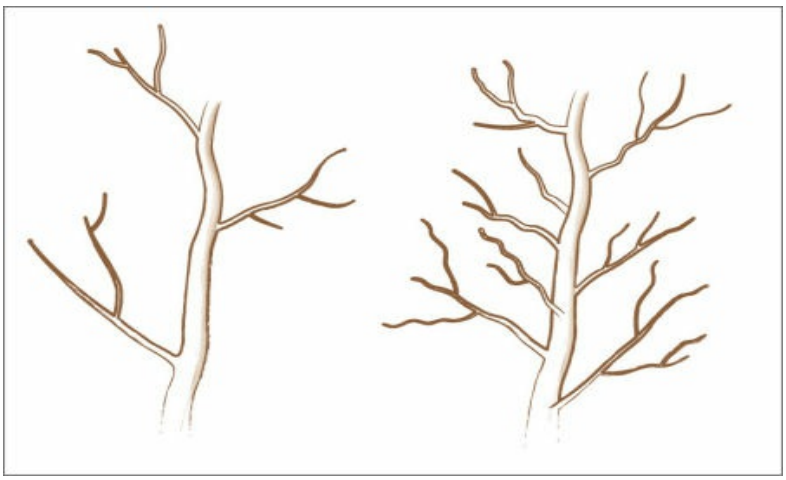
ACER PALMATUM INTERNODES

With all deciduous species,it is useful to retain shoots with short internodes (the distance between the leaf-pairs) and remove those branches with long internodes. Long internodes can be especially prevalent with Acer palmatum and in order to produce good foliage density, must always be addressed.



Long internodes (a) and short internodes (b).

Vigorous, immature growth on all Acer species will very often have long internodes.



Ramification being built on a branch with long internodes (left) and on a branch with short internodes (right).

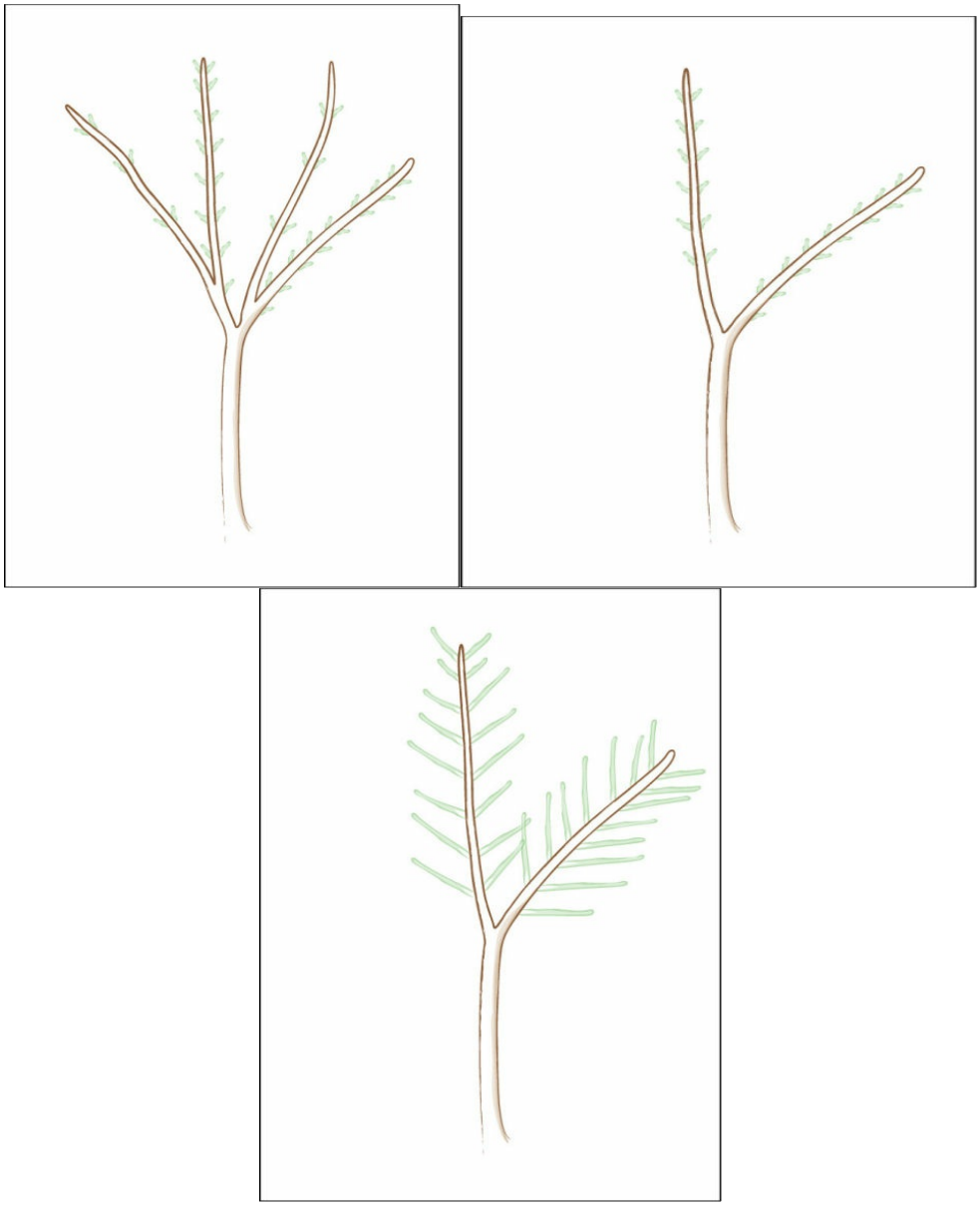
This is problematic because the distance between any future branching that occurs at the nodes will be too long. These areas with long internodes will be difficult to create a dense canopy resulting in blank or bare areas of the trunk or canopy.

Whilst pruning, if you have a choice of shoots or branches to remove, always try to prune back those with the longer internodes. This will help achieve good foliage density in the future.

Keeping the shoots with longer internodes will lead to sparser foliage in the future.

The occurrence of long internodes increases when an Acer is especially vigorous and/or has a reduced number of buds through which to direct its

energy; for instance, after trunk chopping or hard pruning.



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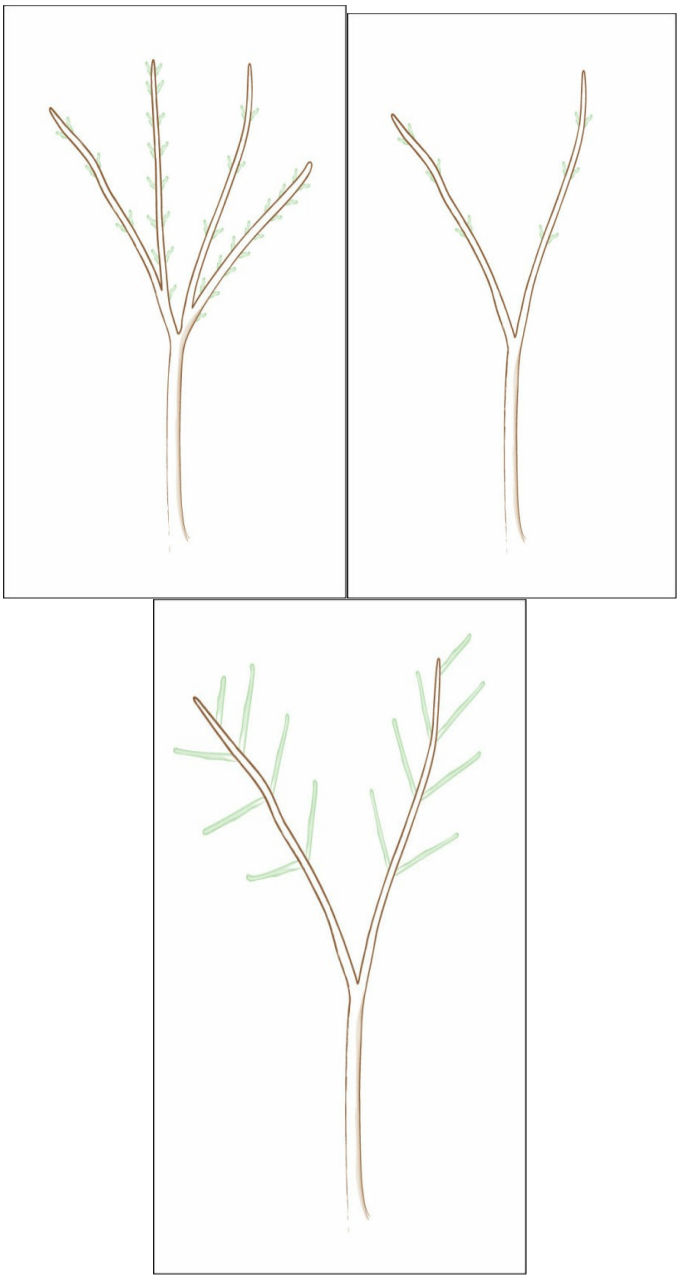


Keeping the shoots with longer internodes will lead to sparser foliage in the future.

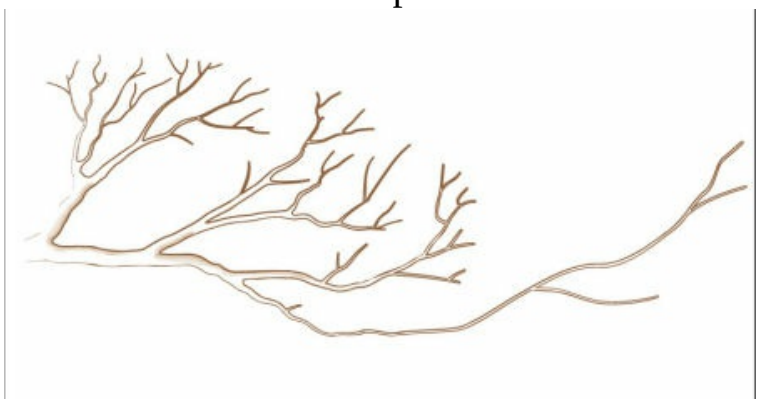
One method of combating long internodes is by using what I term as a ‘sap drawer’

USING A SAPDRAWER

Again, this is a technique that can be applied to many deciduous tree species but is especially useful for all Acer species (Trident, Field as well as

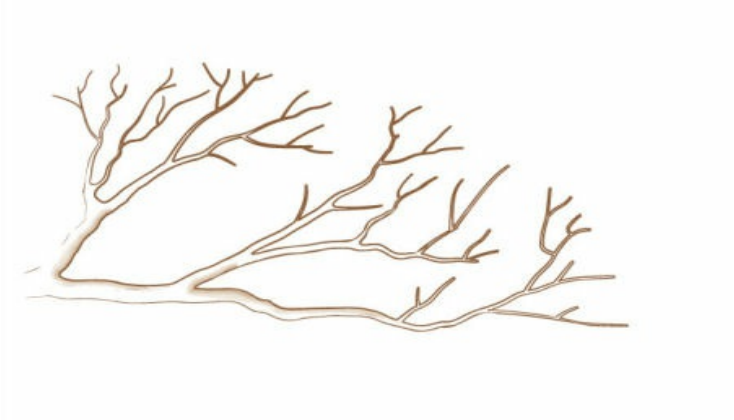
Japanese Maples).

After bud break, pinch all apical buds with the exception of one that will become the sapdrawer.



The sapdrawer will be used to ‘soak up’ the excess energy of the tree and protect the other branches from developing long internodes.

When the first flush of growth slows after bud break (in spring, after bud break or to a lesser extent, after defoliation) the sap drawer can be removed. The sapdrawer can be left and allowed to grow for an extended time to help thicken the whole branch if necessary.



POSITIONING ACER PALMATUM

It is always recommended that Acer palmatum be protected from the Sun and Wind as the leaves are liable to sun and wind scorch. However, this advice is more applicable to the US, Australia and similar climates, in the UK, my experience of Acer palmatum is that strong, well rooted, and healthy Japanese maple bonsai can be kept in full Summer sun. Good light conditions ensure smaller leaf size, better back-budding, denser foliage with stronger autumn colours.

Specimens with weak or reduced root systems due to poor soil conditions or having been recently root pruned will have difficulty supplying enough moisture to the leaves in strong winds or bright sunlight and leaf scorch WILL occur. These trees should be afforded a more sheltered position outside. If you are unsure of the vigour of your Acer palmatum bonsai or the effect of your climate on this species, err on the side of caution and provide protection against the sun and wind in summer.

CHAPTER 10

EUROPEAN BEECH

Fagus sylvatica/European Beech

Progression Series

April 2001: the newly purchased bonsai.

I bought this European Beech in April 2001 from a bonsai nursery; its price had been reduced because, I was told, it was a ‘little weak’. I was told that the tree had been part of a large group planting that had been taken apart the previous winter, and this was the main tree(s).

I was very impressed with the movement in the main trunk, and there seemed to be a good possibility of using all three trunks for a clump-form bonsai. Unfortunately, I was also seduced by the ramification of the branches. As it was to turn out, none of the ramification was usable for a tree with a single trunk.

Little work was carried out on the tree during 2001; the tree was obviously weak and needed the year to recover. After a bad case of white-fly infestation during the summer that is typical of an unhealthy Beech, the tree

seemed to settle down.

I was not happy with the water-retentive peat-based soil the tree had been planted in by the bonsai nursery, so in early 2002, I took the opportunity to bare-root the tree. This was also an opportunity to discover how the three trunks of the tree were connected and to establish the ‘front’ of the tree as a future bonsai. As can be seen left, after bare-rooting the roots, what there were of them, were not a pretty sight! There were many, many dead and rotted roots; one of the trunks was entirely separate from the other two and was discarded. Worst of all, the two main trunks were joined a few inches above the nebari leaving an ugly section of reverse taper.

Feb 2002: after bare-rooting the tree and cleaning away the old organic soil it was obvious that the root system was very weak.

I potted up the tree using good quality bonsai soil into a much smaller mica training pot. It was then time to start pruning the tree into shape. It was at this point that I realised that while the tree had great ramification, the majority of twigs (and therefore the foliage during the summer) were at the tips of the branches. Where the tree had been incorrectly pruned for many years, the primary (main) branches were bare except at their very tips.

As can be seen in the image below, by the time I had shortened back the branches to a respectable length, there was little ramification left! By this stage, I had decided that the second trunk was unsuitable for use and had to be removed. This could have been done during dormancy, but its complete

removal was left until midsummer when the resulting wound would heal much more quickly.

Feb 2002: the tree repotted after bare-rooting.

Around this time, I happened to speak to someone in the bonsai trade who was aware of this Beech tree and its history. To my amazement, he explained that it had quite a chequered past and some pedigree.

It was originally collected as one of a series of young trees, and assembled together as a group planting, in the late 70's by Craig Coussins and Peter Adams (both renowned UK Bonsai Masters and authors). Craig later told me that, at the time, he and Peter made many Beech group plantings of which this was only one.

The group planting had been around for years being bought and then sold on by a number of bonsai enthusiasts. Finally, it had been doused with Paraquat weed-killer by its last owners' angry wife (!) and the majority of the trees had died; this, the main tree, had survived and had been separated away from the dead trees into a pot. Which is why I found it growing cheaply at the back of a bonsai nursery! No wonder the thing was weak and had so few roots.

Beech are awkward trees to develop. Though a Beech tree will produce new buds further back along a branch (back-bud) if pruned very hard, unlike the majority of deciduous trees, if a branch is pruned back leaving no viable

leaf-buds, the entire branch can often dieback. This left me with the problem of trying to shorten bare branches without any inner buds to cut back to.

The tree is pictured up in September 2003. By this time, the thick secondary trunk had been removed. However, there was still no inner growth, and as I was having great difficulty getting the tree to back-bud so I could shorten those horrible, ugly branches!

September 2003. The thick secondary trunk had been removed.

It was at this point that I ran across an old translated Japanese article on Beech pruning techniques. It explained that by pinching out new shoots in the spring and partially defoliating the tree in late spring, Beech can be forced to back-bud and ramification is easy to achieve. (These techniques are described in detail later in this chapter).

A year later, at the end of 2004, I had been able to shorten back all of the primary branches to new inner buds. It was now possible to start filling out those new shorter branches

November 2004: Finally I was able to shorten the branches, cutting them back to new inner buds that had grown in the previous year.

By this time, the tree had completely recovered its vigour and had become root-bound, so it had been slipped into a larger bonsai pot by Erin Bonsai.

June 2006. After two and half years of using these newly-learnt techniques, the tree can be seen immediately after its annual partial defoliation (removal of the spring leaves), and the increased ramification of the tree can be seen.

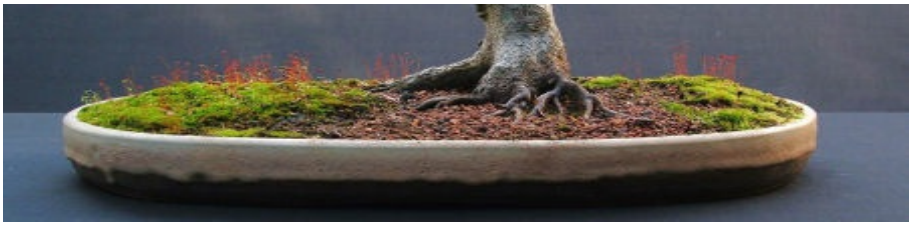
June 2006. After partial defoliation.

July 2006. A few weeks later and the tree has leafed out again and is really beginning to look presentable again after just over 5 years of development. The height of the bonsai by this time was 22”/55cm.

July 2006. The tree in leaf.

November 2007. 18 months of development later and the rust brown autumn leaves that would normally cling to the branches until the spring have been removed and the tree is pruned back once again. Ramification of the branches has increased dramatically, and the tree has really come of age. Though there is still significant room for improvement, the nebari (surface roots) have developed well. In years to come I would hope to introduce some

taper and division in the long straight root on the left hand side.



Beech nebari

January 2009: 8 years after originally purchasing the tree in a very forlorn state. Following the annual removal of the leaves and rewiring of the previous year's new growth the Beech can be enjoyed in all of its beauty.

Species Guide

Fagus/Beech

Fagus is a genus of 10 species of deciduous forest trees widely distributed in temperate regions of the Northern hemisphere.

The common or European beech (Fagus sylvatica) is one of our most important native species in many areas of the UK; the Japanese beech (Fagus crenata) is very closely related. If grown as solitary specimen trees, both species mature into tall stately trees with a spherical crown and branches that reach down to the ground.

The bark is grey in the European beech and silver in the Japanese species, but remains smooth even on very old specimens of both species.

Tiny flowers appear with the leaves in spring and are pollinated by the wind. In autumn, they form nuts which are commonly referred to as beech mast.

Leaves are arranged alternatively; the European species has ovate, wavy-edged leaves to 10cm which are pale green in Spring appearing as late as May in the UK, turning glossy green in Summer and then to yellow to orange-brown in Autumn.

The browned foliage commonly remains on the tree throughout the winter protecting the following year's leaf-buds, sometimes not dropping until the following spring. The Japanese beech, Fagus crenata has these same characteristics, but its leaves are slightly smaller.

Though it is Fagus sylvatica and Fagus crenata that are the two Fagus species seen as bonsai; there is good potential for other Fagus species to make quality bonsai. It should be noted that except for Fagus sylvatica, Beech require long, warm summers to thrive and in parts of Northern Europe the relatively short summers can be disadvantageous to vigorous growth.

Beech species and Hornbeams (Carpinus species) are often confused as they have many similarities particularly in their leaf appearance; the simplest way to differentiate them is to inspect the trunk; Beech have an entirely smooth bark whilst Hornbeams develop silvery veins on the surface.

BONSAI CULTIVATION NOTES

POSITION

Beech will grow happily in semi-shade or full sun; they do however require a position sheltered from the strong midday sun of the summer and from strong winds, both of which can cause leaves to scorch and brown.

In conditions where there is strong sunlight or strong wind, Beech require more generous quantities of water especially if planted in a shallow pot. Root frost protection is required when temperatures reach -5°C or less.

FEEDING

For refined trees, it is better to withhold fertilising for 3-4 weeks after leaves appear in spring to keep the vigorous spring growth finer with shorter internodes; after this initial strong growth, feed fortnightly until late summer. For trees where trunk or primary branch development is still taking place, feed as soon as leaves start to unfurl.

REPOTTING

Every two years in spring as the buds extend, use basic soil mix. Older specimens can be repotted as and when necessary.

PRUNING

The main growth spurt for beech is in the spring; to improve ramification of branches it is important to pinch out the growth tip after the first or second leaf emerges, this will greatly reduce the inter-nodal length.

Allowing the shoot to extend will result in coarse growth with long internodes (though this should be allowed if trying to thicken trunks or primary branches in young trees).

After spring growth has fully extended, prune back to a bud that is facing the way you wish future growth to head.

Hard pruning can be carried out in late-winter or mid-summer. Removal of large branches can be carried out in midsummer to accelerate wound healing.

Wiring needs to be carried out with great care as the bark marks very

easily and wire marks can take an extremely long time to fully disappear from the smooth bark surface. Branches suddenly thicken after spring growth and wire can cut into the bark in a matter of days. Try to make use of guy wires to move branches into shape if at all possible.

PROPAGATION

Sow seed outside in autumn or after winter stratification in spring. Air-layer in late-Spring after spring growth has hardened.

PESTS AND DISEASES

Aphids, bark scale and powdery mildew.

STYLING

Beech suit all formal and informal upright-forms in medium to extra large sizes. Beech are slow-growing and creating a large-trunked bonsai is a slow process. For this reason, beech are commonly seen in group plantings as trees with relatively thin trunks can be used to good effect.

Advanced Pruning Techniques for Fagus sylvatica/European Beech Bonsai

Fagus sylvatica, or the European Beech, are a very common sight in the UK tolerating shallow chalk and clay soils. As a child growing up in the Chilterns Hills outside London, tall majestic Beech woods were a common sight.

As such a common native UK species, Beech saplings are often collected to develop as bonsai. Unfortunately, they are not an easy tree to use for bonsai successfully. Trunks take a long time to thicken, back-budding can be awkward and sporadic, and the development of ramification in the branches takes a long time.

Many Beech bonsai issue just one flush of growth each year during May. Field-growing Beech and very vigorous Beech bonsai will then have a second

flush of growth in July.

This slow growth rate coupled with a general lack of back-budding can result in Beech bonsai having long and bare primary branches that just have ramification on the tips of the branches. Trees like this then need to be rebuilt from the inside outwards.

It is very necessary to realize that while a trunk-chopped Beech will issue new adventitious buds, any branches that are pruned back (shortened) must be done so that there is at least one visible bud left, otherwise the whole branch may fail and dieback.

The main aim of this article is to address both the problem of slow growth and the lack of back-budding in Beech bonsai, through the use of pruning and defoliation techniques.

Beech bonsai can be thought to have a ‘predetermined’ leaf surface-area limit each year; that is, when the tree has produced and hardened off a certain surface area of leaves in the spring, it ceases to grow for the rest of the year.

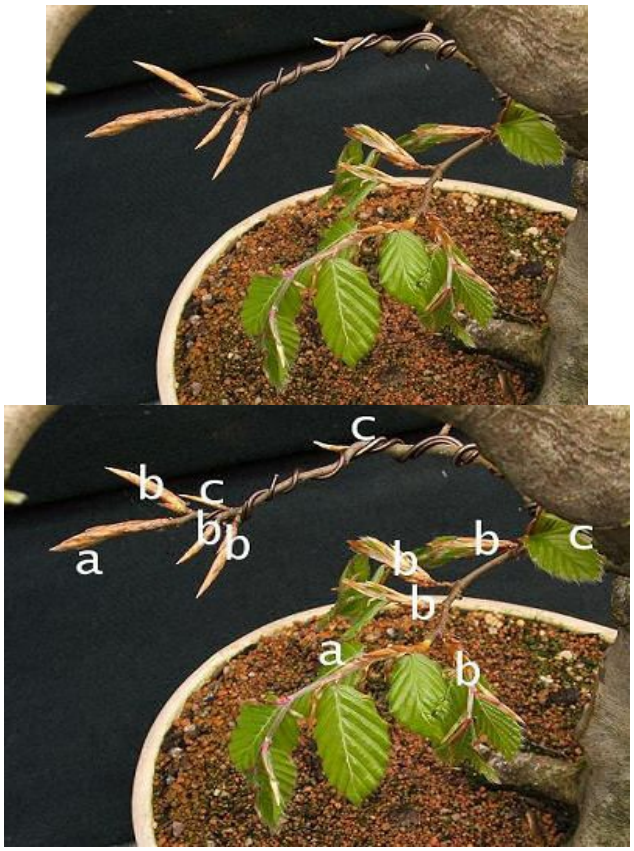
By pinching back new shoots as they extend and defoliating (removing new leaves) before the leaves harden off, the tree is repeatedly forced to try and replace this lost growth, very often by producing new buds and shoots on the inner areas of the branches.

Beech shoot in early May, only 3 days after the bud started to extend.
This is the ideal time for pinching back this shoot.

PINCHING BACK

As the new shoots start to extend in spring, pinch/cut the new shoots back, leaving the first 2 leaves at the base of the shoot. Weaker low and inner shoots can be cut back to 3 or 4 leaves if necessary or left longer if extension is required.

Images showing the relative strengths of two Beech branches. The strongest buds (a) should be pinched back hardest in order to strengthen the weaker buds (marked b). The weakest buds (c) will fail or only produce a single leaf and no new shoot, unless the strongest buds (marked a) are pinched back.



This pinching will result in a second flush of growth in a few weeks time and prompt buds further back along the branch (that might otherwise have remained dormant) to leaf out and extend new shoots.

The spring buds of a Beech do not all open at the same time as can be seen in the images above; the strongest buds will open first followed by the weaker new growth. It is therefore necessary to carry out pinching back 2 or

3 times over the course of a fortnight or so.

Pinching back to 2-3 leaves will ensure that all remaining inner buds will go on to produce a new shoot and not fail.

One major advantage of pinching back Beech spring growth is that it reduces both leaf-size and internode length. This is particularly necessary for healthy and vigorous bonsai that would otherwise produce coarse growth.

DEFOLIATING

Beech can produce such dense canopies of leaves that the branches on the interior die back. New inner shoots and leaves will also fail to open and replace them.

As the new leaves set and turn to a darker green colour, they begin to shade out the branches and can make a very dense canopy in which only the buds at the tips of the branches have access to light, that will prompt them to swell and open.

Allowing more light into the canopy will help strengthen the inner shoots and branches but Beech can respond poorly to full defoliation (complete removal of all of the foliage at one time). However, they respond well to partial defoliation.

Start to partially defoliate by removing the largest leaves found on the tips of the branches, this allows more light into the inner branches and strengthens the inner buds, leaves and shoots.

Leaves after new growth has begun to harden in early summer.

After partially defoliating/removing the inner leaves.
Removing a leaf causes the bud at its base to extend. Where a leaf remains the bud will not extend.

Possible new shoot extensions (new leaves not shown).

Always remove leaves from the inside of a branch but retain most of the leaves on the tips of each shoot; this will encourage the buds of the defoliated leaves to open and extend while keeping those buds at the tips (with their leaf remaining) dormant. This is the primary way of causing back-budding and strengthening the weaker inner buds and branches in Beech.

Partial defoliation will prompt a second flush of growth in Beech; the resulting new buds can be pinched if necessary as described earlier in the article.

Further partial defoliation can be carried out on healthy trees during May, and June to keep them producing more and more flushes of new growth. However, it is recommended to feed aggressively and to allow the tree to rest from July onwards.

WINTER PRUNING

In winter or early spring, Beech can be pruned back to take advantage of back-budding that was produced in the previous year.

This image shows a new branch that was produced using pinching and partial defoliation techniques in the previous year. (The dead leaves that cling to the branches of Beech have been removed in these images for clarity).

This new growth can be pruned back during dormancy in the winter to create natural movement and taper in the branch. It can also be carried out so that the strongest buds and the foliage that follows (next year) are closer to the trunk.

Pruning back at this time can be as hard as required. Branches can be pruned back very hard to create very strong taper and movement in the branch and to shorten the overall length of the branch so that the resulting

foliage is closer to the trunk.

The bonsai will respond well to pruning as hard as this, as long as that vital last bud is left so that the branch does not die back.

The author pictured with the bonsai in spring 2010. Image courtesy of Claire Simpson.

Many enthusiasts, particularly beginners, will try making their first bonsai from Nursery Stock. In this case ‘Nursery Stock’ means ordinary trees and plants, intended for planting in the garden or landscape, which can be purchased from Plant Nurseries and Garden Centres.

Nursery Stock can be useful subject matter on which to practise wiring and pruning. Nursery Stock can be made into bonsai, however, it takes some experience, and luck to create a good quality bonsai in this way.

One of the biggest hurdles new enthusiasts need to cross in using nursery stock is that when choosing and then styling the plant, the plant will rarely have a trunk of good proportions. Unless the material is severely chopped and styled as a very small (mame-sized) bonsai or grown on in the ground for a number of years, the trunk will always look skinny and immature.

CHAPTER 11

ALBERTA SPRUCE

Picea glauca var. albertiana ‘Conica’/Alberta Spruce

Group Planting Progression Series

Picea glauca/ Alberta Spruce have a poor reputation as bonsai. In their natural form, they are very tree-like, and as a result, they often appeal to novice enthusiasts who then struggle to prune, wire and style them into shape as bonsai.

My experience with these trees is that they require thorough wiring to form a good quality bonsai and they require repeated re-wiring before the branches hold into their new positions. However, pruning is very straightforward, and if carried out correctly, tight pads of foliage can be created in remarkably little time.

December 2005: The main two trees in this group planting were a lucky purchase. I discovered them growing in two half-barrels at a nursery that was clearing out an old display for just £6.

December 2005: Three Picea glauca purchased for £6 from a plant nursery sale. The tree in the foreground is a slightly different variety hence the bluer foliage, and therefore, could not be used for the group. However,

the two trees behind it growing in half-barrels were perfect for this project.

As can be seen in the image above, they both look very much like ‘proper’ trees as they are. So why prune or style them at all?

Both trees have an immature 'pointed' apex, and the foliage mass dwarfs the relatively thin trunks. To rectify these faults, both trunks need to be reduced in height, their branches shortened back, and the apex rounded. Unfortunately, this work resulted in two very ugly looking trees until they were then styled!

December 2005: After chopping the trunk and pruning the silhouette of the trees to achieve good scale and proportion.

With both trees planted into a large wooden training box, it was time to chop the trunks that would provide the basis for the design of each tree and the group planting as a whole.

September 2006: A year later and having recovered from the previous years' chopping, I pruned the branches back even further.

I measured the width of both trunk-bases and chopped both trunks, so their height would be exactly 10 times that of their trunk base.

This procedure is essential to create the illusion of a group of trees seen growing together. By ensuring that the trees are all in proportion to each other a very convincing design can be achieved.

September 2006: The trees were fed well and allowed to recover through the spring and summer. By September, I had decided to carry on working on this project.

Late Summer/early autumn is a good time to prune and wire Picea. In the UK, repotting can also be carried out once the heat of the summer has subsided, but the first frosts are at least 6 weeks away.

The trees were pruned back again, thinning away branches that were not required for the final design, while trying to retain branches that had foliage closest to the trunk.

The sap of Picea will still bleed at this time of the year (after pruning heavier branches), but wounds can be effectively dressed with Vaseline or to ensure that the sap stops flowing immediately, a little wood hardener can be applied to areas where the sap is weeping. This hardens the sap and stops it running.

I purchased a further 5 Picea glauca from another garden centre and I started working on the remainder of the group planting.

September 2006: 5 smaller Picea glauca of exactly the same variety as the two larger trees were purchased.

Each of the smaller trees was pruned to reflect the dimensions of the two main trees.

September 2006: And they were immediately trunk chopped using the same proportions as before.

These smaller trees were intended to be placed in the background of the planting as though seen in the distance; for this image to work, the scale of all of the trees in the group had to be equal and, so the trunks were carefully pruned to the same ratio of 10:1.

Finally, the five ‘background’ trees were wired and roughly styled.

September 2006: The 5 new tree after chopping the trunks, pruning and being wired.

Pruning severely and wiring many coniferous tree species over the course of just a few days is very stressful; Picea glauca are very tough in my experience, but these trees required some protection from any extremes of the weather for a few weeks until they had a chance to recover.

November 2006: The completed group planting.

November 2006: I received a bonsai pot from Erin Bonsai made specifically for this group planting and could not resist the urge to put the whole group together.

I carefully assembled the planting together in the pot, gently teasing away all surplus soil so that the remaining (untouched) roots would fit together in the tight confines of a bonsai pot.

After a few days of tidying and lime sulphuring the deadwood, rearranging the branch placement of the trees and adding some moss and stone, the group planting was finished, for the time being.

While I had originally added 5 background trees for a 7-tree group planting, I found that a total of just 5 trees made a cleaner and less cluttered design and two of the trees were removed.

The height of the tallest tree is 19”/47cm; the pot by Erin Bonsai is 22”/54cm wide.

Species Guide

Picea/Spruce

Picea is a genus of 30-40 species of monoecious, evergreen, coniferous trees occurring in forests in cool-temperate regions of the N. hemisphere. They have whorled branches and needle-like leaves set singly around the shoots, these leaves are persistent for a number of years.

Picea can be a difficult tree species to style as bonsai. Their habit of throwing out whorls of branches leads to bar branches and trunks can have poor taper unless care is taken in training, back-budding on older wood is rare so it can be difficult to keep the foliage mass close to the trunk.

There are many Picea species that are suitable for bonsai cultivation, most have short needles and respond well to Bonsai techniques. Some species such as Picea glauca ‘Albertiana Conica’ are naturally slow-growing and can take many years to develop. Probably the most frequently used Picea species for Bonsai is P. abies though P. orientalis, P. glauca and P. sitchensis/ Sitka spruce are all of equal value.

BONSAI CULTIVATION NOTES

POSITION

Full sun with shade from the mid-day sun during the summer. Fully hardy to at least -10°C. Spruces are very tolerant of wind and benefit from good air circulation.

FEEDING

Every two weeks throughout the growing season. A high nitrogen feed in summer when the following year's buds are forming is beneficial.

REPOTTING

Every two-three years in early to mid spring just before bud-break. Older trees require less frequent repotting. Use a fast-draining soil-mix. Protect from full-sun after repotting.

Care must be taken when repotting; never wash the roots (bare-root) a Spruce and never change more than half of the soil surrounding the actual root system in one repotting. Care must also be taken when root pruning newly styled root systems. There is a direct (but 'invisible') relationship between each root and each branch and shoot in the foliage mass; pruning away a root that is solely supporting a branch will lead to the death of that branch. Conversely, in the years after trunk-chopping or heavy branch pruning, expect the related roots in the rootball to have died and begun to rot.

There is a school of thought that suggests planting a Spruce into its bonsai pot a year before styling, so it is possible to ensure that all branches used in the design will survive the root pruning. This also applies to other similarly root-to-branch connected species such as Pine and Juniper.

PRUNING

New growth should be pinched out after shoots have extended to 2-3cm long, leaving 4 - 5 needle-clusters. Hard prune only in autumn to reduce sap loss/bleeding. Never use cut paste or wound sealant on resinous species such as Spruce as the resulting wound will continue to bleed heavily and become very messy. Instead, use a thick smear of petroleum jelly.

WIRING

Wire only in autumn and winter as wiring during the spring and summer can result in the dieback of branches.

PROPAGATION

Sow seed outside in spring. Take ripe-wood cuttings in late summer. Cuttings can take a very long time to strike.

PESTS AND DISEASES

Aphids and red spider mites.

STYLING

Suitable for all forms except broom in all sizes.

SPRUCE BONSAI STYLING, PRUNING AND WIRING

Spruce have a terrible reputation as bonsai amongst many enthusiasts.

They are regarded as difficult to style, difficult to encourage the branches to set into new positions through wiring and difficult to create good ramification with little if any prospect of back-budding

Unfortunately, the ubiquitous Picea albertiana ‘Conica’ has not helped matters; very often picked up by beginners looking

for nursery trees to style into bonsai, despite their initial ‘tree-like’ appearance, the Alberta spruce has been known to cause great annoyance and frustration!

However, there are some excellent examples of Spruce bonsai in Europe and Japan; the genus as a whole has some excellent qualities and very often, it is just a question of learning how to work with Spruce and its foibles so that the best can be made of this tree.

This article is primarily based on my experience of Picea albertiana and Picea pungens although these techniques can also be applied, with degrees of

success, on all vigorous Picea/Spruce bonsai.

SPRUCE VIGOUR

The techniques described in this article assume that your Spruce is vigorous and that care is taken when applying these techniques to weak lower and inner branching. The easiest way to judge the vigour of a Spruce and its individual branches is to look at the number of new buds that have formed, very often at the tips of the foliage, in late summer. Branches with no buds are very weak and are likely to fail/dieback in the following spring. These are best left alone. Branches with one bud are weak and will tolerate minor wiring and needle plucking. Branches with two or more buds are strong to very vigorous, and all of the techniques described can be applied.

TIMING

Spruce is sensitive to timing. In particular, styling and wiring must not be carried out while the tree is in active growth as branches are very likely to fail and dieback. In the UK, extensive styling is best carried out from late summer (August) through to the first frosts around November.

WIRING

Spruce have incredibly supple branches. With the use of thick enough wire and guy wires, branches of over 1” can easily be bent without danger of snapping or cracking. Thinner mature branches can be bent and contorted in a variety of directions to bring the foliage closer to the trunk.

This suppleness is also problematic; wired mature branches can take years to set into their new position, often requiring repeated rewiring. However, I found that on a number of occasions, branches that have had twists and turns put into them have set into position within a year.

When branches of any tree species are wired into a new position, the cambium is broken (however minutely), and repair of the damaged parts of the cambium layer, by the tree, sets the branch into its new position.

With Spruce, it would seem that more manipulation is needed to damage the cambium in order that the tree will be prompted to repair the damage and

set the branch.

Care must be taken though as major manipulation of a Spruce branch in the late spring and summer will cause it to dieback very quickly. This is why Spruce should be styled from August onwards. After this time, I have found that Spruce are very tolerate of all wiring and styling.

STYLING

Featuring short needles and very often an overall dense foliage mass the Alberta Spruce seems eminently suitable for bonsai. However, once all of the bar branches have been removed, the enthusiast often finds that he is left with a small number of thin, ill-spaced branches that only have foliage growing on the tips.

Unless a Spruce has been specifically trained in the ground for bonsai, and the branches are appropriate (short with foliage near the trunk), the most suitable design will be one that uses the first 2 or 3 branches with the uppermost (remaining) branch used for the new trunk line and imitates a wild tree or yamadori.

If one studies pictures of good quality Spruce bonsai on the internet or in books, as with Juniper, many of the designs use only a very small number of primary branches (that is branches that grow directly from the trunk) but have had many secondary and tertiary branches developed to greatly increase ramification and foliage density. Unless you have suitable raw material with the appropriate sized trunk and short branching, informal or formal upright Spruce bonsai are very difficult to style realistically or to any real quality.

PRUNING SPRUCE

Left to their own natural growing pattern, Spruce will produce one flush of growth each year. New shoots extend from buds set in the previous year; these buds are nearly always at the tips of the branches. Back budding without some kind of pruning regime is very rare. Without some forward planning, all the needles of the tree will be on the tips of the branches leaving otherwise bare branches.

THE ANNUAL CYCLE OF PRUNING

(The exact timing will vary slightly according to your climate and location)

August-October: Needle plucking, wiring and pruning back of the current years shoots to a bud if necessary. To tidy up a foliage pad, new shoots formed in the current year can be pruned back to a bud further back along the shoot. Pruning back leaving no bud for next year will sometimes result in a new bud forming and sometimes will result in dieback of the whole shoot. As you would a pine, needles can be plucked from the previous year's growth, this will occasionally prompt back-budding and makes wiring considerably easier and neater. Do not needle pluck weak shoots. Trees that have been repotted earlier in the season should be observed carefully for vigour. Needles can either be plucked with fingers or cut with scissors at the base of the green part of the needle leaving the brown sheath that attached the needle to the branch itself.

From May/June onwards the current season's growth is easy to identify with all Picea species as it has a lighter more vibrant colour and soft wood.

May: Cutting back the first flush of growth. New growth extends from the buds set last year. Allow to extend 1”-2” and then cut the new green shoots back with scissors. On strong apical shoots, cut back by a 1/3, on weaker shoots or those on the lower branches cut back by a ½ or less. On very weak branches or where a branch is required to extend, do not prune back. Do not allow the new shoots to extend too far before using this technique or back-budding will be limited.

This image was taken 2 weeks after the new shoots were pruned back (Picea glauca). It is possible to see both the pruned tips of the new growth and the resulting fresh buds starting to extend.

May-June or 2 to 3 weeks later: the second flush of growth follows. In the weeks immediately following new growth pruning, a second flush of buds will develop and start to grow. New buds will develop at the point that you pruned the first flush of growth back, at the base of the first flush of growth and further back on older wood, very often where needles were plucked in the previous August to October. The second flush of growth will emerge from many points, but each new shoot will be much shorter creating much more dense growth. Allow these shoots to extend only pruning back any unwanted individual shoots that grow much stronger than the others. The tree should then be left until at least August to reinvigorate and develop new buds ready for the following year. The year long cycle is then complete ready for needle plucking to be carried out again.

Compare the density of the Picea glauca branch that has been needle plucked in August and pruned in May of each year, with that of the unpruned

Picea pungens branch pictured below.

Developing Bonsai From Airlayering

One of the best ways of propagating material for bonsai is by airlayering branches from mature field (or garden) growing trees.

It enables bonsai enthusiasts to obtain healthily-rooted material of anything up to 10”/25cm in diameter, with mature bark, good movement and advanced age.

This method of obtaining material for bonsai is an easy technique to master for enthusiasts of all levels, and is one that can produce results of a very high standard in a relatively short time.

CHAPTER 12

FIELD ELM

Field Elm/Ulmus minor

Progression Series

Layering is a method of creating new bonsai or ‘potentsai’ from trees or shrubs that, in their present state or stature, are undesirable or unsuitable for bonsai cultivation.

Bonsai can be created from well formed branches of fully grown trees, poor quality bonsai can have desirable sections rooted and separated from the rest of the tree, and good quality material with poor nebari can have new suitable nebari formed as air-layering produces roots emanating radially from around the new trunk.

Layering is also a straightforward method of propagation that although relatively unused in the West, has been tried and tested in China and Japan for centuries. For some species such as Acer palmatum and Azaleas, layering is the most reliable way of creating new stock vegetatively.

The principal of layering in all its forms is to injure the wood of the parent tree, so that the flow of nutrients from the parent trees’ roots to the layering’s leaves is kept intact, whilst the flow back from the layering’s leaves to the parent trees’ roots is interrupted.

The injured part of the bark slowly heals, forming a callus from which adventitious buds are able to form new roots into the growing media. The layering continues to be supported by the parent tree, however, the food energy its leaves produce go into building its own new roots. When the layering has sufficient roots of its own, it can be separated from the parent and is then able to support itself.

Layering should always be carried out in Spring when the first flush of leaves have hardened on the parent tree and the parent tree is putting on a great deal of root growth of its own. This timing allows enough time for a layer of many tree species to become established on their own new roots before the onset of the following Winter.

GROUND LAYERING

This form of layering mimics the process by which some species propagate themselves naturally. Low branches on some plants come into contact with the ground as they lengthen and become weighed down by their foliage; from these points, adventitious buds produce roots into the ground and the root system eventually becomes established enough to support the branch as a plant in its own right.

Suitable species for ground-layering include Acer, Azaleas, Berberis, Buxus, Chaenomeles, Chamaecyparis, Cotoneasters, Euonymus, Forsythia, Hedera and Wisteria. It is always worth investigating around the base of all of these species when found growing in the garden or field to see if there are any naturally occurring ground-layers that can already be removed.

To create ground-layers artificially, try to find fairly young growth that will touch the ground; make an upward slit in the underside of the bark where roots are required. Dust with rooting hormone and wrap the wound with long-stranded sphagnum moss. The section of the branch to be rooted now needs to be shallowly buried in the soil, and pegged in place with a piece of U-shaped wire.

This process should be carried out in Spring and should be left for at least three months ensuring that the area is kept damp. If the layer has failed to root after 3 months, re-cover it and leave until late-summer. If it has still failed to root by this time, it is still worth leaving it in place until the following Spring. When successfully rooted, the new plant can be removed and planted up.

Don’t be too eager to separate the layering, it is better to leave it intact until there is enough root system to support the layering, rather than remove it too early and watch it slowly die. If there are not enough roots on the layering by September, it is better to leave detaching it until the following Spring as a new immature layering may not survive on its own through the Winter cold, however hardy the parent plant is.

AIR-LAYERING

Air-layering is similar to ground-layering except that it utilizes branches that are growing off the ground and so the injured bark/rooting point has to be encased with growing media wrapped in polythene (or similar). Branches

of up to 2” (or much more) diameter can be successfully rooted leading to the possibility of creating new plants with high potential for bonsai.

Branches on fully-grown trees have particularly vigorous growth and can be pruned over successive seasons to form thick tapering trunks for bonsai, which can then be air-layered from the parent tree.

For deciduous trees, air-layering is carried out in April to May as new growth hardens off and changes to its Summer colour. For evergreens, air-layers should be left until a little later; from late April until July.

There are two methods of injuring the parent tree to provide a site for new roots to grow. The most frequently used technique is ring-barking. Use a sharp knife to cut two parallel slits at least 2 times the diameter of the branch around the circumference of the branch. Remove the ring of bark between these two cuts and the underlying cambium layer (which is green and ‘soft’).

Make the ring-bark just below where roots are needed on the parent-tree’s branch. The ring-bark should be made just below an old leaf-node as it will contain several adventitious buds, all with the ability to become new roots.

Do not be tempted to leave a strip of bark across the ring-barking as this can allow the parent tree to bridge the air-layering and no new roots will be produced. For the same reason, ensure the ring-barking is wide enough so the parent tree is unable to bridge the gap as it heals.

The cambium must be entirely removed; this means removing the entire green layer below the bark as well as any other soft white pithy material, leaving just the ‘shiny’ white wood underneath the cambium layer.

One of the main reasons that air-layers fail is when the cambium is not entirely and thoroughly removed. With many tree species, the tree will try and bridge the ring-bark; this is easier for the tree than producing a new root system. Purposely leaving a ‘bridge’ of cambium as is occasionally suggested and tried, is a sure-fire way to ensure that the tree does not have to produce new roots.

The alternative method to ring-barking is the tourniquet. This is suitable for species that are unable to cope with the removal of a complete ring of bark. A piece of wire is wrapped very tightly around the branch below the proposed rooting site, as the branch grows the tourniquet bites into the bark and then the cambium layer slowly interrupts the flow of nutrients from the leaves down to the roots. The tourniquet method however is slower to work and more vigorous species can bridge the tourniquet as they grow resulting in a failure to root.

With both methods, dust the section to be rooted with rooting hormone and tightly wrap wet long-stranded sphagnum moss around the whole area. The sphagnum moss is then held in place with clear polythene or a clear plastic bag. Tie the bag securely and make a small hole in the top to facilitate watering.

Whilst waiting for the air-layering to root, ensure the moss is kept wet. After anything between 3 weeks and 3 months, dependent on species, white roots will be seen growing inside the bag. Allow the bag to completely fill with roots; ensuring the moss is kept damp at all times. When the roots have matured and turned brown, the layering can be removed from the parent tree.

Remove the plastic bag or polythene but leave the moss in place as the roots are very easily damaged at this point. Remove as much of the branch below the new rootball as possible and plant the air-layer in a pot of bonsai compost or pure sphagnum moss. Ensure that the layering is tied into place with string, wire or raffia to stop it rocking about in the wind and damaging the new root system. Keep the newly potted layering in the shade and mist regularly until it is established.

WINTER PROTECTION FOR AIRLAYERS

There seems to be general panic where the Winter and air-layers are concerned. The cold and frosts will not damage the air-layer itself. The air-layer itself is just a wound that will have callused over. You don’t pamper a wound from a recently removed branch during the Winter so why an air-layer? Any new roots that are already growing from the air-layer will be more susceptible to extremes of cold in the same way as roots in a small bonsai pot are. However, they are insulated in sphagnum and plastic (you can add a layer or two of fleece or bubble wrap if you wish). If the new roots are damaged or dieback during the Winter, they will be replaced in Spring when the parent tree starts growing again.

New trees (produced by air-layers) should be separated at least 6 weeks before the first frosts, this allows the new roots enough time to develop and strengthen before Winter. If there are insufficient roots on an air-layer to separate it from the parent plant in the Autumn, leave it until the following Spring.

Genera/Species suitable for the tourniquet method include;

Abies, Acer, Cedrus, Cercis, Chamaecyparis, Cornus, Fagus, Juniperus, Larix, Lonicera, Malus, Picea, Pieris, Pinus, Podocarpus, Prunus (don’t use copper wire), Pyrus, Quercus (with difficulty), Azaleas and Rhododendron,

Stewartia, Taxodium, Taxus, Thuja, Ulmus, Virburnum, Wiegela, Wisteria and Zelkova.

Genera/Species suitable for the ring-bark method include;

Acers (Red leaved varieties can be very slow to root) Berberis, Buxus, Camellia, Carpinus, Cornus kousa, Corylus heterophylla, Cotoneaster, Cryptomeria, Gingko, Hamamelis japonica, Hedera, Jasminium, Juniperus, Ligustrum, Lonicera, Morus, Magnolia stellata, Myrtus, Parthenocissus, Prunus, Punica, Pyracantha, Rhododendrons and Azaleas, Serissa, Syringa, Tamarix juniperina, Thea sinensis and Ulmus.

(These lists are by no means exhaustive; most woody trees and shrubs that back-bud/readily produce adventitious buds on old wood can be air-layered with a good chance of success).

The Acer palmatum/Japanese Maple branch to be air-layered

This Acer palmatum branch will be used to create the air layer.

It is late May and the Spring leaves on the parent tree have just started to harden off, so now is a good time to make the air-layer

After ring-barking the branch.

A strip of bark is removed just below an old leaf node. After the bark is removed, all of the green cambium layer below it is carefully scraped away; any cambium left make the layer fail by allowing the tree to bridge the ring-bark.

It is essential to remove all of the cambium layer and to make sure that the ring-bark is wide enough. This is the main reason for air-layers failing.

The finished air-layer after wrapping the ring-bark with sphagnum and plastic.

The area is dusted with rooting hormone, wrapped with sphagnum moss and held into place with a clear plastic bag.

6 weeks later and roots have begun to appear.

Six weeks later and the new roots have appeared in the bag. At this point, care must be taken that the sphagnum moss is kept damp as the new roots are actively drawing moisture from the sphagnum moss.

The air-layer immediately after separation from the parent tree.

Another couple of weeks are allowed to pass whilst the new roots strengthen and then the air-layer is separated from the parent tree.

The tree is then potted up and pruned back heavily to reduce the stress on the new roots.

It is very unlikely that the new tree will put out any new top growth for the remainder of the year; instead it will produce a significant flush of root growth.

The new root system will still be relatively weak for the first year and during the following Winter, extra protection should be given to the tree.

The Acer palmatum after potting up.

New roots appearing through the drainage holes of the pot.

Within a few weeks the roots of newly potted air-layer have filled the pot and beginning to grow out of the drainage hole. However, as should expected, there is no new top growth and there will not be until following year.

The previous images of the air-layering of a relatively young (2-3 year old) Acer palmatum branch is a good example of the process as a technique. However, for more spectacular results, enthusiasts need only look for more mature trees.

A small stand of 20 metre tall English Elm in the wild.

In the Spring of 2004 I discovered this small stand of 20 metre tall English Elm (Ulmus minor), growing on some wasteland near my home. Looking more closely at the trees themselves, I realised that they were composed of several trunks that had developed from suckers growing out of the base of a dead English Elm.

The trunk and major branches themselves were all of a good diameter and had fantastic rugged mature bark. Added to this, I was able to discover a small number of branches that had sections where there was natural taper and good movement making them suitable for bonsai.

During May 2004 I made 6 air-layers of between 2”/5cm and 5”/12.5cm. Walking a few miles into the countryside with all of the apparatus needed to make the air-layers (including several bottles of water) was an event in itself, as was climbing in and around densely packed undergrowth to actually apply the layers!

The bark and cambium layer of an Elm is very thick and spongy and they have the ability to bridge quite a distance. Leaving just a small amount of live cambium within the sphagnum and plastic wrap could easily result in the tree regenerating the live tissue rather than producing new roots.

So, each ring-bark was made very carefully, removing all of the green cambium and then each ring-bark was left fully exposed to the air overnight before the sphagnum moss and plastic wrap was applied the following day. Leaving the ring-bark exposed to the air ensured that the cambium dried out completely and wouldn’t be able to regrow.

Within 5 weeks there was evidence that all of the air-layers had taken as new white root-tips began to appear in through the clear plastic surrounding holding the air-layers I gave each of the layers a few more weeks for their roots to establish and then began the task of separating the air-layers

The completed air-layer after wrapping the ring-bark with sphagnum and plastic.

Above is the first Elm air-layer I brought home, still bagged up, after I had separated it from its parent tree. The point where I actually cut through the trunk was only around 3.5”/9cm in diameter but the dense wood took a long time to cut through, even with a newly sharpened bow saw!

This branch had great natural movement that cannot be truly appreciated in a 2-dimensional image. I had air-layered it just below a point where the branch had naturally flared or ‘bulged’ out to a massive 5”/12.5cm in diameter.

Rather than use one plastic bag to contain the sphagnum moss I had literally had to use several sheets of plastic to bind the sphagnum to the ring-bark!

The Elm has a 5”/12.5cm diameter trunk base.

With the plastic wrap removed it became obvious that the layer had rooted extremely well with new roots appearing around the entire circumference of the trunk.

The tree was then potted up into good quality inorganic soil to be left to recover for the remainder of the year.

Notice that the layer at this point had virtually no remaining leaves as a result of being cut down in height.

This air-layer was part of a branch that was approximately 10 metres in length overall and it had to be reduced at the time of separation so it could be taken home. Importantly however, the branch was not chopped back until after the layer had rooted, as the leaves on the branch were required for the new roots on the air-layer to form.

After potting up the air-layer

With a vigorous deciduous species such as Elm it is possible to chop back the trunk at the time of severing the layer. With weaker broadleaf and coniferous tree species it is important to retain at least some foliage.

During 2004 the layer appeared to remain stagnant; there was no top growth of any particular note other than some new buds appearing on the trunk. However I knew that underneath the soil surface, the layer was busily growing new roots as within a couple of months, fresh white root tips were evident growing from the base of the layer's pot.

Then in 2005, the Elm exploded into life producing a large number of new buds and shoots all over the trunk.

Two years later in 2006 and the Elm air-layer has grown well.

In the image above, taken in the summer of 2006, it is possible to see that I have allowed new side branches to slowly develop, allowing them to grow a short distance before being pruned back.

On the other hand, I had allowed one shoot growing from the very top of the trunk to grow unrestrained. As is discussed later in this chapter, this free growth was necessary to allow the new trunk-leader to thicken in diameter as rapidly as possible to provide taper to the trunk as a whole.

The final Elm air-layer was poorly rooted.

The final air-layer that I severed in the Summer of 2004 was the runt of the litter. But as can often happen, it has eventually turned into my favourite Elm bonsai and is the featured progression tree in this Chapter.

Buoyed with the success of my Elm air-layers of 2004, I had assumed that despite there only being a few roots visible through the plastic wrapping

of this particular Elm, far more would reveal themselves once I removed the sphagnum moss.

Alas, this was not the case! For some reason the air-layer had been much slower to begin to root than the other Elms and this one had sprouted less than a dozen new roots, all of them just a few centimetres in length.

However, as the layer still carried some foliage to help it root and Elm are such a tenacious species; I potted up this final air-layer and left it to its own devices.

The image bellow shows the thinnest (2”/5cm diameter) of the Elm air-layers I took in 2004.

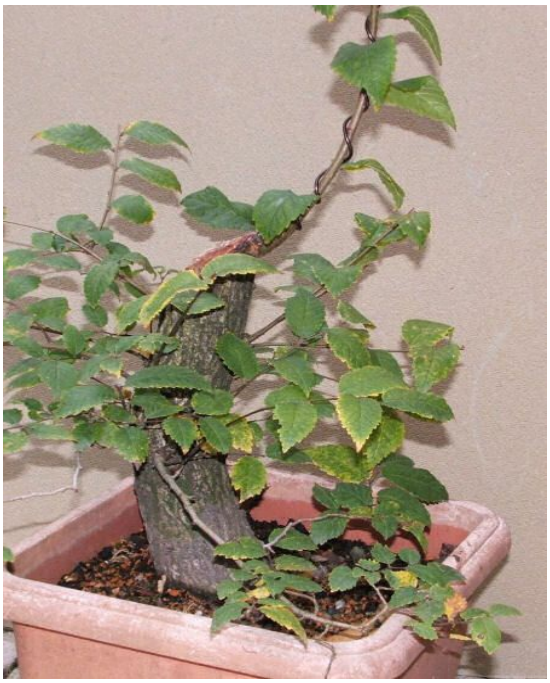
As many experienced enthusiasts will already know, it can be difficult to accurately age a bonsai without either being able to count the annual rings or without knowing the entire history of a tree from its inception.

One bonus of using air-layers for bonsai is that it is possible to examine the base of the trunk and count off the annual growth rings for an accurate indication of the true age of the tree.

This particular Elm had 30+ annual growth rings meaning that the sucker (shoot growing from the base of a much larger tree) had begun to grow in the early 1970’s.

This leads me to believe that the main tree that I already knew to be dead had probably been killed by the outbreak of Dutch Elm Disease that swept through the UK during the 1970’s.

It should be noted at this point that although the parent tree may have eventually succumbed to Dutch Elm Disease there is no reason to suspect that this Elm or any of the Elm air-layers will also have it, now, or any time in the future.



September 2005: just a year later and the Elm has grown well. From this angle it is possible to see the chopping point.

In the Spring of 2005 the Elm produced a large number of buds that quickly began to sprout and extend into new shoots. Confident that the tree would not only survive but also grow vigorously, I began selecting the shoots that I wanted to develop into the future branches and also the shoot that would become the new 'leader' or trunk line.

During the Summer the new leader grew strongly and the original trunk chop was shaped into a sloping cut to improve trunk taper. Summer is an excellent time to carry out work that will create large wounds on deciduous trees as the healing process is very rapid at this time of year and there is little chance of dieback of the cambium and bark around the wound.

From June 2005 through until the Winter of 2007-2008 I continued to develop the Elm by concentrating on finishing the trunk line.

DEVELOPING A NEW TRUNKLINE AND BRANCH STRUCTURE ON DECIDUOUS TREES

The main principles to understand when developing new trunk-lines (new 'leaders') or branches on bonsai are as follows:

The shoots (be they potential branches or leaders) with the most growth will thicken the fastest.

The shoots with the least growth will thicken slowest.

To encourage growth in a shoot, do not prune that shoot.

To encourage maximum growth in a shoot, prune all other shoots on the tree.

To stop a shoot growing, pinch back that shoot.

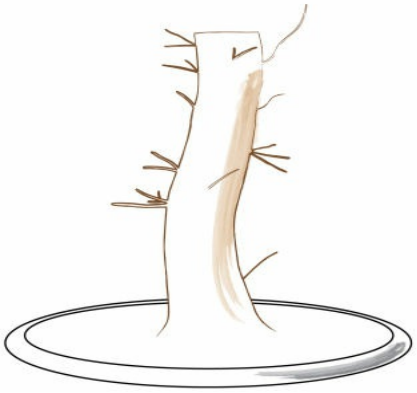
To minimise growth, do not let the new growth extend (by pinching the new growth as it opens)

Using these 6 basic principles, the bonsai enthusiast can control which parts of a tree grow and eventually become thicker and which parts remain as they are.

Developing a branch structure and new leader on a bonsai using these principles can sometimes be something of a Chinese puzzle. However, if one is focussed on which areas of the tree (the leader or the branches or a particular branch) require the most growth and which areas of the tree require the least, it is a solvable puzzle!

Using the Elm air-layer featured in this Chapter I will now illustrate how these 6 principles are applied to a tree stump in order that it can be turned into a bonsai.

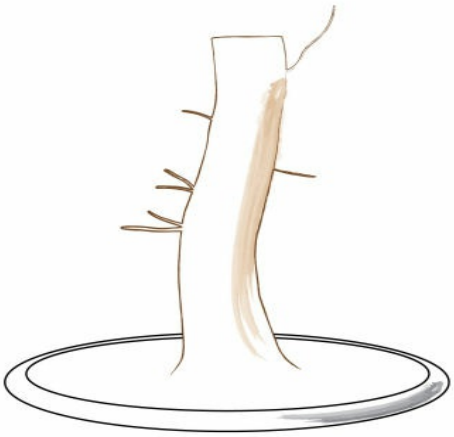
This process, or parts of this process, can be applied to all deciduous trees whether they are completely raw material, a fully formed trunk that requires a new branch structure or even a fully developed bonsai.



At the beginning of the first year of developing the stump, (assuming it is healthy and vigorous) it will produce new buds all over the trunk. These buds will then begin to open into new shoots as temperatures warm in the Spring.

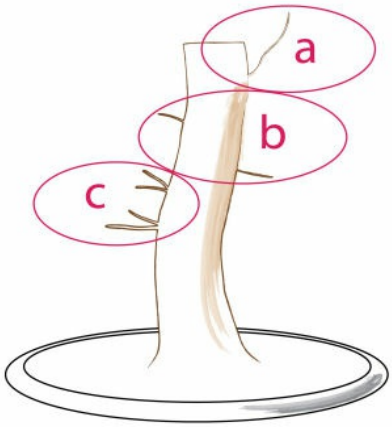
A bare trunk stripped of all shoots and branches in the Autumn will produce considerably more buds from the trunk during the following Spring. Any existing branches that are left after Autumn pruning will reduce the

number of buds that appear on the trunk itself.



The first step for the enthusiast to take is to decide which new shoots to keep for development into new branches and trunk leaders, and which to remove. The sooner that unwanted shoots or preferably buds are removed, the more ‘energy’ the stump is able to divert into growth and development of the shoots that are wanted.

The exact shoots or buds to keep will depend on the future design you have for the tree and if you are not 100% certain whether a particular branch will be required in the future, keep it for the time being. It is always considerably easier to remove a bud or shoot you are undecided upon in the future than it is to replace it in the future.



At this point it is important to understand or remind yourself about apical dominance. Every tree species will have a natural growth habit that will produce different rates of growth in shoots depending on their position on the trunk. At the uppermost part (a) of the tree (be it the top of the trunk and branches at the very top of the tree), growth will be strongest. This means

that there will be more buds appearing in this area; the shoots that they produce will be more vigorous and will have a greater growth rate. Conversely, in the lowest areas of the trunk (c), bud production and shoot growth will be weakest. The areas in-between (area b) will tend to have bud production and shoot growth rates in-between areas (a) and (c).

This principle is pretty straightforward. However, it should be noted that different tree species naturally have different degrees of apical dominance. For our purposes as bonsai enthusiasts, there is no exact science in explaining these differences. Various tree species are just variously described as being ‘a little apically dominant’ or ‘very apically dominant’. It is only with experience that one can establish what these descriptions actually mean in practice! There are also a much smaller number of tree species that can be described as being ‘basally dominant’. In these cases it simply means that the base of the tree is the most dominant part of the tree and the top of the tree is the weakest and the strengths and weaknesses of areas (a) to (c), are reversed. So, bearing in mind the growth tendency of the majority of deciduous trees, if the tree stump in this example were to be allowed to grow freely without our intervention, the leader at the top of the trunk would grow the most and thicken the most.

In this case that is what we hope to achieve, maximum growth in the new trunk-leader so that it will thicken as rapidly as possible, creating better taper to the top of the stump. However, without any pruning, the new shoots in the middle part of the tree (area b) would grow faster than those shoots in the lowest areas of the trunk (c). This would produce branches in area b that were thicker than the branches in area c. This is the opposite of the desired effect in bonsai where the lowest branches are also the thickest.

A second important effect of leaving the remaining shoots unpruned is that some of the tree's resources or energy would be wasted growing these middle branches. Pruning the growth of the middle branches will divert the tree's resources to the trunk leader to ensure maximum growth.

And so, the correct way to deal with this example tree is allow the new leader to grow freely. To allow each of the middle branches to extend and open 3 or 4 leaves and then pinch out the rest of the new shoot so it will not extend any further leaving the tree's resources to be diverted elsewhere. The shoots in the lowest parts of the tree need to be thicker than the shoots in area (b) and should therefore be allowed to extend further than the shoots in area (b), and are left to grow until around 8 or 9 leaves before being pinched out.

The result of this pruning or pinching out will be something akin to the diagram on previous page.

When the new leader has begun to grow strongly it is time to consider carving the top of the trunk to create better taper to the trunk.

The preferred time to do this on deciduous trees is during the growing season, preferably after the first flush of growth has hardened off.

At this time of year the wound resulting from chopping the trunk heals relatively quickly and callus formation (to cover the exposed cambium and to begin the years-long process of covering the large wound) is at its most rapid.

Carrying out this work during the dormant season or during early Spring is unlikely to harm the tree itself, but healing of the resulting wound will be slow or non-existent if carried out in the Winter.

An imaginary line can be made from the base of the new trunk-leader sloping either sideways or backwards (so that the resulting wound is not visible from the front of the tree) using a sharp knife and the excess bark and wood can be removed.

Actual physical removal of the excess wood can be difficult on thick trunks and requires the use of power tools as well as saws. However, where the top of the trunk has a smaller diameter, knob cutters are often sufficient and the excess wood can be removed bit by bit.

Note that the more of a downward slope you create when cutting the trunk back, the better the taper you create in the trunk. However... the more taper you create, the larger the wound and the longer it will be before it heals over (if it heals over completely at all).

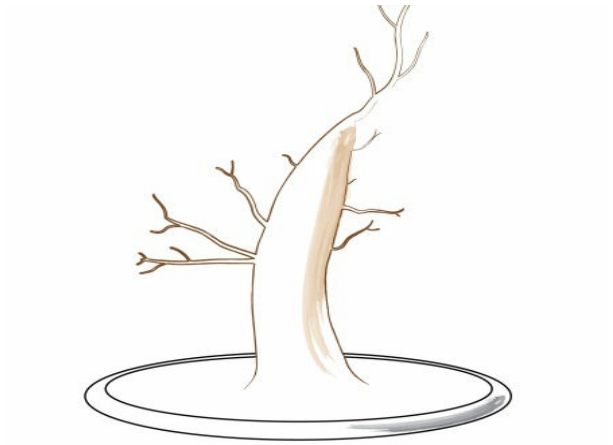
With some species such as Elm there is a good possibility of new buds and shoots appearing along the line of the wound. However, on species that will not do this, the lack of new buds and shoots in this area can leave a large empty gap in the branch structure.

September 2005: just a year later and the Elm have grown well.

This Elm stump (pictured above) has been tapered just a week ago and has begun to heal over already. As you can see I have taken the taper from behind the top of the trunk section down to a new shoot; the presence of a shoot at the edge of a large wound will always speed up healing.

Notice that I have used a wound sealant on the edge of the wound to seal the newly cut cambium layer itself but a layer of petroleum jelly is sufficient for this job and is considerably more preferable on trees with resinous sap such as Pines, Larch and Spruce.

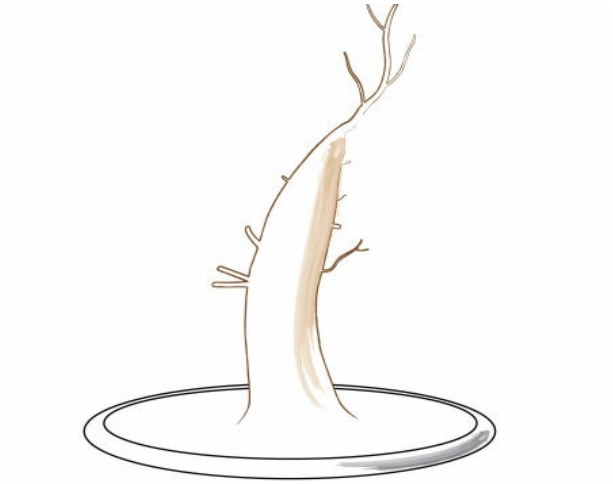
There are schools of thought that say wound sealant is not necessary in certain circumstances but I do prefer to use it simply to ensure that the cambium heals and calluses as quickly as possible.



By the end of the first year of development, (depending on your feeding regime, the vigour of the tree and the species used), the stump will look similar to that shown above.

Due to the pinching out and pruning of the shoots according to their position on the tree, the new trunk leader is the thickest shoot, followed by the lowest branches, with the branches in the middle of the tree being the thinnest.

Note that after pinching out the new shoots in the Spring, each will have been very likely to produce at least two new smaller shoots at the pinching point. If and whenever this occurs during the growing season, the same process of pinching out should be carried out on the newest shoots.



At the end of the growing season (or in certain climates at the very beginning of the next growing season) the stump's growth must be pruned back.

Here in the UK, Winter temperatures rarely fall below -7º and never below -10ºC. This allows enthusiasts to prune and wire their fully-hardy bonsai during the late Autumn immediately after leaf-fall. In areas where

Winter temperatures drop below -10ºC and bonsai can't be protected against this degree of cold, it is recommended that pruning and wiring is not carried out until the Spring when temperatures begin to rise.

Cutting back the current year's growth creates better branch taper in the future; the new shoots that will appear on the branches in the following year will always be distinctly thinner.

New shoots grown in the same growing season as each other will always end up being the same diameter, even when comparing shoots that grew in the Spring and late Summer as each other (as I found out after trying to build branch taper on a small bonsai over the course of one growing season!).

Therefore, if the pruning back of the branches (when developing the branch structure) is not carried out in-between growing seasons, the lack of taper will be obvious in the future.

More discussion on the principles and technique of branch development, and 'Winter' pruning is continued later in this chapter.

The basic principle of pruning this Elm air-layer at the end of the first season of development is to prune according to the apical dominance and the individual development of this tree.

That is; the new trunk-leader is not pruned at all as the process of thickening the upper trunk has yet to be finished.

The new branches are pruned according to their position on the trunk; the lowest branches in area (c) are pruned back hard to just 3 or 4 leaf-joints and the middle branches in area (b) are pruned back even harder, to just 1 or 2 leaf-joints.

One important consequence of pruning back this hard is that it will encourage further production of new buds from the trunk and is an opportunity to fill out any empty spaces in the trunk with new branches. Indeed, this maybe the last opportunity for this event to occur without having to remove all of the branches again in the future.

Those that are not required for the future design are removed to divert the tree's resources into development of those that are.

New shoots are then pinched out as they extend with no interruption in the growth of the trunk-leader, pinching out of the lowest and middle shoots according to their position on the tree.

By this stage in the development, it may become noticeable that there will also be shoots with atypical growth rates. It is not unusual to have a very weak shoot in the middle area (b) of the trunk that should not be pinched out as early as the other shoots in area (b) so that it can thicken a little more.

Conversely there may be a shoot in the lower part of the trunk that is considerably stronger than would be expected considering its position. Such a shoot can be safely pinched out earlier than would be normal.

Notice that I have made no mention of repotting at the beginning of the second year; unless there is a strong reason for repotting and/or root pruning the tree (issues with poor soil, an urgent need to shape the nebari etc), allow the roots free growth to encourage the fastest possible development of the trunk-leader

By midsummer of the second year an Elm will have had the appearance

of the new Spring shoots that have then been pinched out; resulting in a second flush of shoots that should also be pinched out. This process of allowing varying degrees of growth that is then pinched out (and pruned back if necessary) carries on throughout the growing season.

For some vigorous tree species this process can need to be repeated 4 or 5 times between Spring and Autumn, with other species or with weaker trees, there may be only 2 or 3 new flushes of growth in a growing season.

By the end of year two, the Elm can easily be as well developed as the illustration above. The branch diameters are in accordance to their position on the trunk and the trunk-leader is now thick enough to make a convincing trunk line.

Winter pruning Year Two. The branches are all pruned back hard in accordance to their position on the trunk and their vigour in the same way as they were at the end of Year One. With the Elm air-layers trunk leader having reached the desired thickness, all of the top growth is chopped back to a thinner side shoot. By comparing the two images above it is possible to see

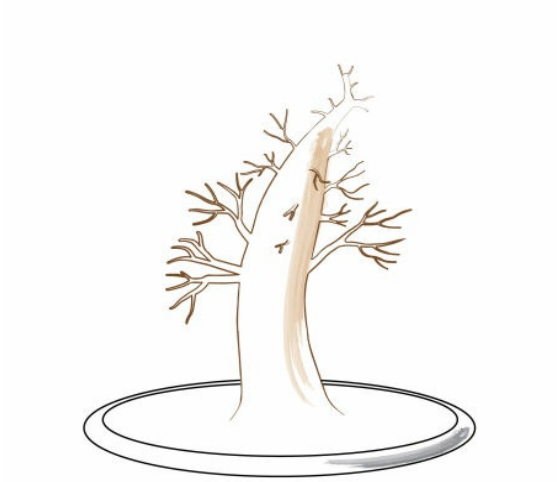
that by chopping back in the way that I have done, the trunk now has a smooth tapering trunk with good movement.

One mistake that I often see by beginner enthusiasts is to not be brutal enough when they chop back resulting in the top of the trunk line looking too long and taper-less itself, while the unnecessary additional height reduces the power and strength of the tree itself.

However difficult it maybe to reduce 2-3 years worth of growth and a metre or two of live wood to just a few centimetres, it is an essential aspect of trunk-building to then be able to reduce the growth back properly.

It is important to understand that once the trunk-leader has been chopped back and the top sacrificial growth removed, in the future it will not noticeably increase in diameter as growth from the top area (a) will always been tightly controlled to ensure that the uppermost branches of the bonsai remain thinner than those in the middle and lower areas of the bonsai.

If the trunk-leader is not thick enough to make a smooth transition up the trunk from the original stump, it should be allowed to continue to thicken. (Note that the process of chopping back the trunk-leader can also be made during the growing season, this part of the technique is not limited to the dormant season).



Year Three: In the Spring, with the trunk-leader having been pruned back so hard, a large number of very vigorous buds will appear at the top of the trunk. It is important at this time to be very diligent about removing unneeded buds and pinching out the new shoots.

Now that the trunk and trunk line has been fully developed, the balancing of vigour throughout the tree will change. Development of the uppermost branches (the apex or crown) begins and the shoots that grow here must be thinner and weaker than those in the middle and lower areas of the tree.

This requires that any new shoots in this uppermost area are only allowed to extend and open 1 or 2 new leaves before being pinched out while shoots in the middle area are allowed to extend by 3 or 4 new leaves and the lowest and naturally weakest shoots should be allowed to extend to 5 or 6 new leaves.

This process of redressing the energy and vigour of the tree continues throughout its life and the basic principles concerning growth and thickening of the branches can continue to be applied wherever necessary. Branches that are too thin for their position on the trunk (in particular lower branches) can be allowed to extend (grow) longer in order to thicken them faster than the other branches.

It can also be ensured that branches in the uppermost areas of the trunk do not become too thick by pinching them out.

June 2006.

December 2006.

From June 2005 through until the Winter of 2007-2008 I continued to develop the Elm as described already.

January 2007.

The new leader was allowed to grow freely for 2½ years until it was thick enough to create convincing taper into the stump and then in early Spring 2008 it was chopped back hard to a thinner shoot low down on the new trunk.

After chopping the trunk-leader in early Spring 2008.

After chopping the new trunk leader in early Spring 2008. note that the very top shoot was being used to graft a new branch into place near the large wound on top of the stump, hence the strange angle of growth!

As can be seen in the image above, I have wired the developing branches into shape and have left some of them unpruned so that they will increase in diameter more quickly next year.

Autumn 2009.

Autumn 2009 and the tree has continued to develop well during the previous 18 months. As is typical of all apically dominant trees, the branches in the upper part of the branch structure have been very quick to grow and develop. As the last of the leaves start to fall I like to begin the process of

Winter wiring and pruning.

AUTUMN/WINTER WIRING AND PRUNING

As discussed earlier in this Chapter, it is important that enthusiasts in areas where their trees will be exposed to temperatures below around -7ºC apply these techniques in the Spring when the last of the severe cold has finished.

The horticultural principle behind this timing is that the branches and the tree itself do not become fully dormant until a few weeks after the leaves have fallen (new pruning wounds made during leaf-fall will noticeably begin to heal), and any tiny cracks and fractures made during wiring at this time will also have time to seal against the cold in the depths of Winter.

It may indeed be possible to carry out Autumn wiring and pruning in colder climates than my own; however without the necessary experience I cannot advise it.

Whenever these techniques are actually carried out, they are an important aspect of bonsai development and maintenance and should be applied at least every two years to keep a bonsai in pristine condition.

The primary objectives of Autumn/Winter pruning are:

1) the pruning back of new shoots to address the balance of the branches (as already discussed) and to improve branch taper

2) shaping of the branches with wire to improve the placement of older branches and to place the previous year's growth correctly.

This is the Elm air-layer in Autumn 2009 with all of the remaining leaves

removed. As can be seen in the image above, the bonsai now has an impressive number of branches (ramification) however, the branches have become messy and the true aesthetic form of the branch structure has been lost.

Within the branch structure there are also a number of branches that have ‘faults’; that is, branches whose improved appearance, or removal would improve the image of the bonsai overall.

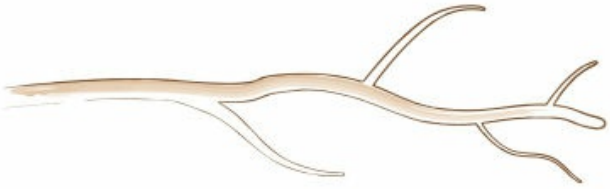
When working on the entire structure of a bonsai, it is simplest and easiest to work methodically starting on the lowest branches and working up the tree towards the apex or crown.

Working from the bottom upwards is a good habit to get into for the enthusiast; the shape and style of the lowest branches should dictate that of the branches higher up the trunk and it is considerably easier to manipulate or even re-grow the upper branches in accordance to the lower branches on a bonsai than vice-versa.

The lowest branch of the Elm air-layer has been allowed to grow freely during the growing season to encourage it to thicken.

Shoots such as these that have grown outside the silhouette of the tree are pruned back. Where there are more than two shoots growing from any one point, the extra shoots should be also be automatically removed.

As an example, this is a branch that requires pruning back slightly so it is within the silhouette of the tree.



If the 3 branch tips are simply pruned back a little the branch will then have 3 branch tips but an opportunity to improve taper will be missed.

For better taper, the main branch line is pruned back to the side branches producing more refined branch tips.

For even better branch taper in the future, the branch could be pruned even further.

The resulting growth in the Spring will quickly fill out the structure of the branch, however, obviously the tree’s foliage mass will be thinner in the immediate future which is why pruning back this far would normally be reserved for trees in development.

After pruning back all of the required shoots, the remainder are wired into shape where necessary.

All new shoots (from the growing season that has just finished) that do not grow in the correct direction or are too straight are wired to add movement and direction to them.

This step is very much part of the artistic side of bonsai and the exact placement of the branches will depend on the individual.

Some enthusiasts prefer a ‘classical’ or ‘abstract’ style of deciduous

bonsai and the majority of the branches will be downward growing.

Other enthusiasts prefer a more ‘naturalistic’ style of branch placement and will try to imitate nature by arranging the branches on a deciduous tree so that the lower branches will drop downwards from the trunk but then rise gently at the tips and the upper branches will automatically rise as can be seen on deciduous trees in the wild.

Whilst the exact styling of a bonsai is down to personal taste, my personal preference tends to be for more naturalistic styling and I would encourage enthusiasts to follow this direction and avoid the more primitive abstract styles of yesteryear.

This second example of autumn/winter pruning concerns a branch near the apex of the elm air-layer

At first glance it is easy to see that the growth is too straight. Each of the shoots also needs to be positioned slightly lower into an area of the crown that is at present empty.

Straight growth, be it on trunks, branches or minor shoots, should always be avoided as they will always make a bonsai look immature whereas growth with plenty of (realistic) movement will add age and interest to a bonsai.

The first step is to quite simply coil bonsai training wire around the shoots of the branch.

And then movement is added to the shoots by making them bend not only from side to side but also up and down.

The final shoot has movement applied to it and now the 3 secondary branches in this area of the tree are finished for the time being.

Each of the shoots should not look exactly the same after they have been wired but they must have similar movement to each other

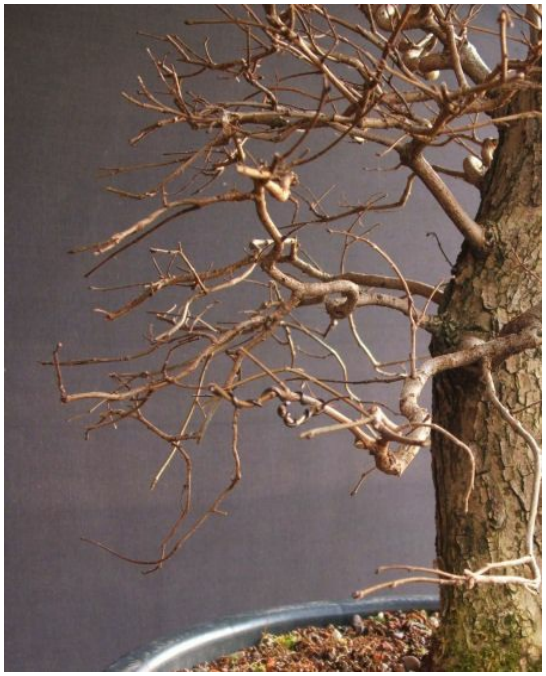
That is, they should look as though they have grown under similar

circumstances to each other on the same tree but there must also be an element of randomness to their movement as well. Otherwise in the future, when the wire has been removed, it will be obvious that the shoots have been artificially placed.

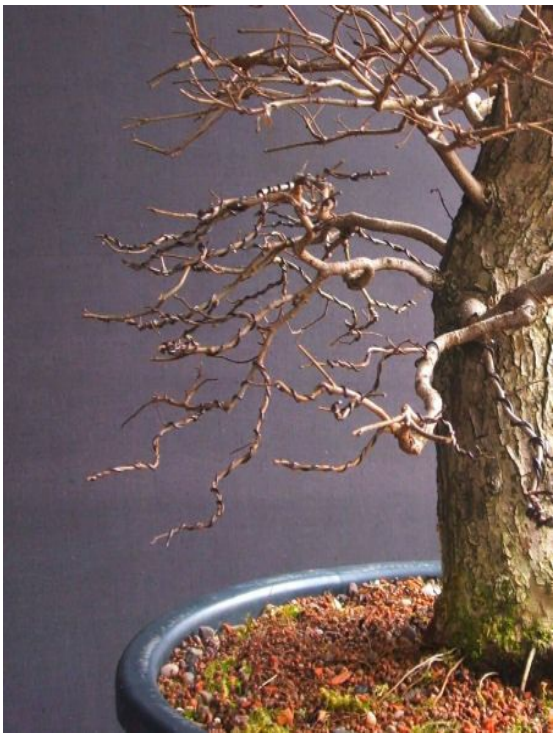
One of the main purposes of wiring is to create the illusion to the viewer of the bonsai that the tree is a miniature version of one found in the wild and that the bonsai has grown naturally into shape by itself. Therefore, long term evidence of wiring and artificial placement need to be avoided.

Use twists and bends of similar degrees but in different combinations to achieve a random effect when placing newly wired branches.

Make sure that if the trunk has very heavy twists and turns, this is reflected in the movement of the branches as well. Similarly, if the trunk has very slow, gradual bends, its branches should reflect this.



These are the lower left hand branches of the Elm air-layer The older branch sections have been pruned and wired a number of times in the past but as is normal some of them have naturally lifted out of position while the new growth has not been shaped before and has no natural shape or pattern.



After wiring the new lower branches and rewiring those that have lifted out of shape, some order has been restored.

Straight shoots have had movement wired into them and have been placed so that they all grow outwards in their own space.

Notice that I have not tried to form a ‘cloud’ of foliage. ‘Clouds’ of foliage are something of a cliché in bonsai and should really only be considered on coniferous species where they would be found growing naturally. Rather, on deciduous trees, each of the leaves and shoots naturally grow into space where they can receive maximum light.

After many hours of pruning and wiring the branch structure has been

arranged for another year.

Notice that when seen from above, the branches and individual shoots fan out into their own individual spaces. Although each branch has been individually wired and styled, they all combine to produce one cohesive design where no one particular branch or shoot looks out of place.

As noted before, Autumn/Winter styling is a time consuming process but it is not only an essential task but one that produces spectacular results, short- and long-term.

December 2009 After pruning and wiring the Elm air-layer

December 2009 As can be seen in the image above, I have styled the Elm in a 'naturalistic' style. The branches avoid the clichés of all being placed on a horizontal plane and I have retained primary branches in such a way that they do not grow from the trunk in a left-right-back, left-right-back formation as used to be advised for the unnatural abstract styling of yesteryear.

Note that the apex has been shaped with a steep slope towards the right and gradual slope towards the left. This almost subconsciously indicates to the viewer that the tree is growing towards the sun on the right hand side. This means that the first or primary branch also grows towards the right, despite not being the lowest branch. Additionally, the branches on the left hand side (the 'shaded' side of the tree) have a tendency to grow upwards, whereas the branches on the right hand side have a tendency to grow outwards towards the 'sunny side' of the tree.

These are all subtle visual clues that we all see in trees everyday and as bonsai enthusiasts, can harness to create a more convincing image for our bonsai. With the pruning and wiring of the Elm complete, I decided that it

was now ready to be repotted into a bonsai pot in the Spring of 2010 and a pot was ordered from my favourite potters Erin Bonsai.

There are many visual clues that we all use to give the impression of age in a tree. Short term solutions are to style the branches of a bonsai on a horizontal plane to give the impression of aged branches weighed down over time by the weight of the sub-branches or snow lying on them through the depths of winter. Or to allow a massive number of sub-branches to develop (ramification), to create a dense canopy of leaves. However, these short-term solutions cannot replace and should not be confused with the genuine characteristics of great age in a bonsai, taper.

February 2010: The Elm and its new bonsai pot.

February 2010: In early Spring 2010 I received the new bonsai pot from Erin Bonsai and set about repotting the Elm air-layer

As can be seen in the accompanying image; the bonsai pot was considerably shallower than the nursery tub that the Elm had been living in for the past few years!

However, I knew that the tree had a rootball consisting of mainly relatively thin young roots and that the root system could be reduced to fit into the pot.

Removing the excess soil by hand.

Using an old plastic tub to collect the old soil, I started carefully teasing apart the root-mass Despite the tree being root-bound (the soil stayed intact when the tree was lifted from the pot) I knew that only a tiny percentage of the overall volume of the soil actually consisted of roots. With the excess soil removed by hand, the actual root-mass began to look much smaller.

The stump at the base of the trunk is what remains of the original air-layered branch.

At the base of the root-mass I found the bottom of the branch used to make the original air-layering In order to fit the trunk into a shallow bonsai pot, this needed to be removed.

The protruding stump is removed.

The stump was removed from the base of the trunk using an electric reciprocating saw to make a flat cut.

The base of the trunk after removal was complete, notice that I used some old plastic bubble-wrap to protect the delicate bark of the bonsai while laying it on its side.

With the old base of the trunk removed, I finished removing the old soil from the rootball and began to root-prune the root system in order that it would fit into the bonsai pot.

As Elm as a species are very vigorous, producing new roots easily and this particular specimen was very strong, I know that I could remove a large volume of the actual root system. In total I removed approximately 60% of the roots so that the tree could be potted up.

When all root pruning had been finished, I placed the tree into a tub of water to soak the roots for 30 minutes to ensure that they were fully hydrated.

Finally the tree was placed on a shallow bed of soil in the base of the pot, tied securely using tie-wires and then the remainder of the pot back-filled with soil.

This last image shows the trees having been very thoroughly soaked and watered in to make sure that every void around the root system was filled with soil and no air-pockets were left.

The Elm in Spring 2010. Image courtesy of Claire Simpson.

The author pictured with the Elm. Image courtesy of Claire Simpson.

SHAPING DECIDUOUS TREE BRANCHES

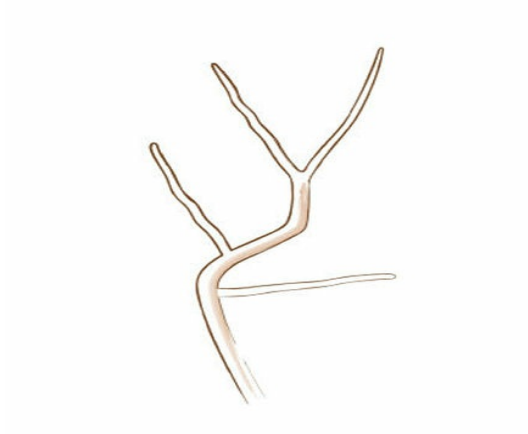
To further illustrate deciduous tree building it is necessary to see how they are grown and developed over the years and the overall shape that one should aim for in a deciduous branch.

Year One: The new branch as seen from above.

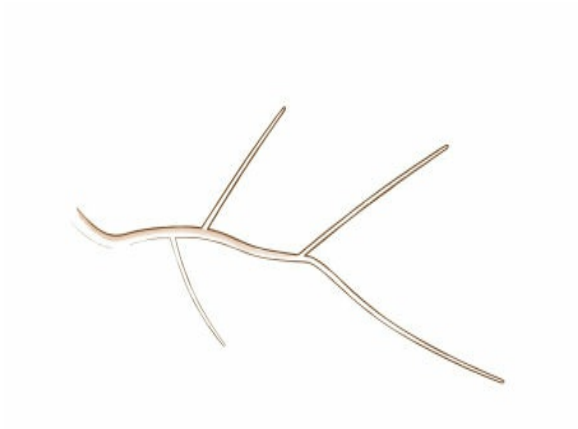
Year One: The new branch seen from the side.

Year One: A new shoot is allowed to extend from the trunk and it is then wired in Autumn to provide movement. This first shoot is also known as the 'Primary Branch'.

Notice that there is movement from side to side and up and down. It is worth putting some slightly exaggerated movement into the shoot as over time, as the shoot thickens, the bends will become less pronounced.

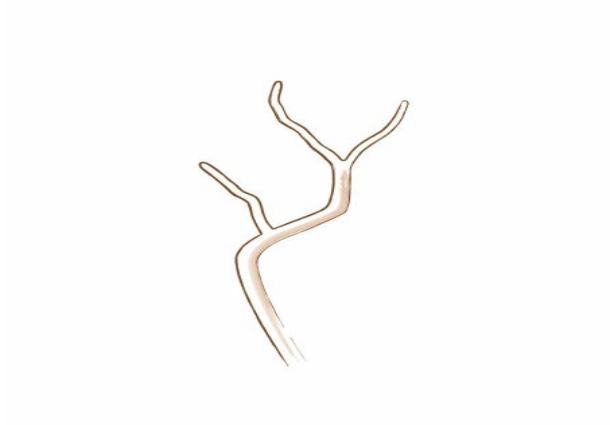


Year Two: The unwired branch as seen from above.



Year Two: The unwired branch seen from the side.

Year Two: At the end of the growing season and after pinching back the new shoots that have appeared on the Primary Branch there are 4 new shoots that require pruning, wiring and moving into position.



Year Two: The wired branch as seen from above.

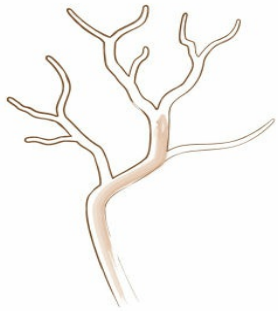
Year Two: The wired branch seen from the side.

Year Two: After pruning and wiring. One of the new shoots (also known

as secondary branches) has been removed because it was growing from the inside of a curve on the primary branch.

The three remaining secondary branches have been shortened slightly and had movement added to them.

See from the side it is possible to see that the secondary branches roughly follow the same line as the primary branch from last year. Two important aspects of the positioning of these shoots are that they do not cross each other or the primary branch and they have similar (but not exactly the same) movement.



Year Three: The newly wired branch as seen from above.

Year Two: The newly wired branch seen from the side.

Year Three: As in the previous two years, new shoots have appeared at the tips of the branches. Also, as a result of pinching back these new shoots, ‘back-budding’ has occurred where new shoots have appeared further back along the branch.

The new shoots have been wired in the Autumn as previously described with the new shoots following similar but not identical lines to each other. When seen from the side it is possible to see that the new shoots on the branch have been wired so that they are still not crossing.

When the branch is seen from above it is possible to see that the shoots form together into a large fan-shape with each branch dividing into two new sub-branches.

Year Five: The wired branch as seen from above.

Year Five: The wired branch seen from the side.

By year five the branch has really begun to take shape. Ramification (the twiggyness) is excellent and there is good taper to the branch. A bonsai carrying a large number of branches as well developed as this would make an impressive sight.

But what happens now? Is the bonsai ‘complete’? Are there any improvements that can still be made? Or does the bonsai remain in stasis, a finished work of Art?

THE IMPORTANCE OF BRANCH TAPER IN BONSAI

The answer to these questions is a resounding no! A bonsai is never finished. This statement is something of a cliché amongst enthusiasts but it is also a statement that very often holds true. While the trunk of a bonsai is the anchor, the ‘base’ of any design that only marginally changes once the tree is growing in a bonsai pot, the branches are far more fluid and changeable.

Artistically, the branches are used to reflect the strength and age of the main feature of the tree, the trunk, and improvements to the impact that the branches have on the tree itself are relatively easy to make.

One of the best ways of indicating the great age of a bonsai to its viewer is taper in the branches. Just by taking a walk out into nature during the Winter and the evidence of the importance of taper is there for all to see.

Whether you are an avid bonsai or tree enthusiast or someone with little interest in the Art, it is immediately obvious from this image that the tree is fairly young.

To understand what makes a tree look old and to then be able to replicate this in a bonsai, first it is helpful to understand why the tree above is so obviously not very old. Study the tree as though seeing it out of context; in other words see it as you would a bonsai where there are no external visual references such as surrounding vegetation or nearby trees.

The first part of the tree that the eye notices (consciously or subconsciously) is the trunk. The trunk is very straight and this can often be an indicator of a juvenile tree but as anyone who has seen images of Dawn

Redwoods with their 50metre plus trunks will testify, having a straight trunk is not conclusive evidence of immaturity.

However, the fact that the base and the top of the trunk are almost indiscernible in diameter does give a visual clue to age. In other words, the fact that there is little taper between the base and the top of the trunk.

The second part, or aspect, of the tree that the eye notices is the branches. On first glance they seem juvenile. Some enthusiasts would believe that the fact that the branches grow upward (rather than growing downward) creates this impression and accordingly will style the branches of their bonsai so that they grow downwards or on horizontal planes ‘to give an impression of age’. My belief is that this idea is incorrect and a bonsai consisting entirely of downward growing branches does not look like a real tree but a caricature or cartoon-image of a real tree.

My belief is that the branches look immature because they lack taper. They lack taper from where the branches grow from the trunk to their tips, and also there is little taper from the trunk to the branches and relatively little difference in size (and there taper and scale) between the trunk base (the thickest part of the tree) and the very tips of the branches (the thinnest parts of the tree).

These two trees were photographed just 50 metres further along the same river as the previous tree.

Seen out of context of their surroundings, it is still immediately obvious that these trees are considerably older. They create an immediate impression of age. But what are the key differences between these two trees and the juvenile tree pictured earlier? How can we apply these visual keys to our

bonsai to increase their impression of age?

Unlike with the juvenile tree, it is immediately obvious that the trunk is old. But rather than this being because the trunk has movement (curves and bends) or the mature bark that is barely noticeable in this image, it is the taper of the trunk that shows us that the tree is considerably older. We know that the trunk must be big and wide and therefore old, because, in contrast to the base of the trunk, the top of the trunk is much thinner.

The real key indicator of age in this image is the massive difference between the very fine branch tips and the trunk base.

Multi-trunk Willows seen growing in a field in middle England.

This contrast of delicate fine twigs and a rugged, powerful trunk is emotive to even the undiscerning viewer, and is much clearer to the eye than the fact that the trunk itself does or doesn’t have taper or whether the branches grow upwards or downwards! And this is why taper is so important in bonsai; we need to replicate the naturally occurring visual clues that nature itself provides for us.

An old Oak seen growing in a field near Manchester UK.

This Oak photographed in Norfolk, UK is an excellent example of the power of taper as a visual clue of age. As a 50cm tall bonsai this tree would break so many of the old ‘rules’ that it would no doubt be cast aside by anyone trying to create a classically-styled bonsai. However, despite what would be described as ‘faults’ in bonsai circles, this is undoubtedly a beautiful tree of impressive age and stature, one that could be studied as well as enjoyed for many years.

Modern-day thinking in bonsai is that if we are trying to imitate the natural beauty of trees rather than creating abstract cartoon-copies of other bonsai we have seen and there are now a number of bonsai artists around the world that are using nature’s visual clues (including taper) to create high-quality bonsai art.

So how do we apply taper to the example of a deciduous tree branch? And how can this branch be improved further over the forthcoming years?

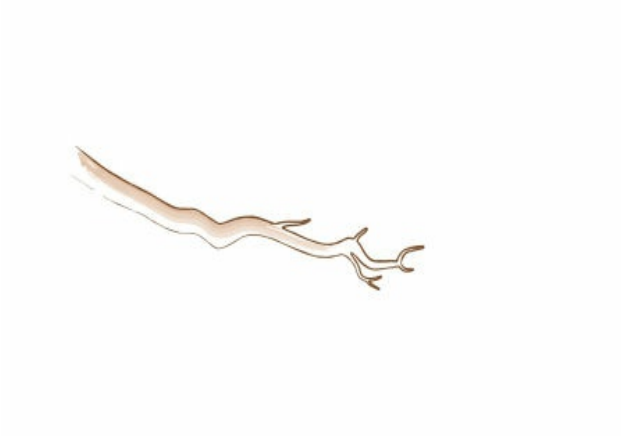
The example branch again, after approximately 5 years development. It has now reached the size and length required for it to fit within the overall silhouette of the bonsai. If in the future, the branch is simply pruned back repeatedly to keep it in shape it will slowly increase the ramification (number

of tertiary branches) to an impressive number. The density of the foliage will greatly increase and leaf-size will be reduced. Both of which will create a good impression of age in the bonsai during the growing season. However, the taper of the tertiary branches will be slowly lost and the taper between the branch base and the branch tips will slowly diminish.

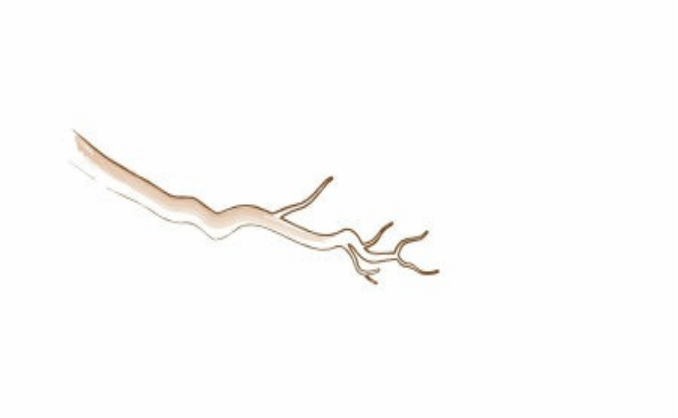
Over the course of a number of years the tertiary branches will continue to thicken but for various reasons the primary and secondary branches will barely change in diameter and eventually the branch will look like that above. As already noted the ramification of the branch is impressive but as the taper disappears, so will the true impression of age.

So how is the branch rejuvenated? Quite simply, by pruning it back very hard and rebuilding it. Bonsai are said to be never finished, and this is a good example of what this cliché actually means. Bonsai is a unique art form in that unlike other pieces of art, a tree is forever changing, however subtly. Though removing the ramification of the branch can feel very much like a step backwards in the development of the tree, long-term it is a large leap forward.

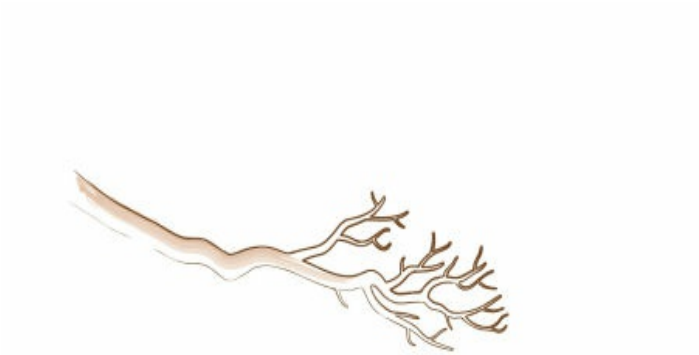
The branch is cut back hard to a smaller diameter secondary branch that becomes the new primary-branch line. This work can be carried out in the summer but it is preferable that the branch can be studied clearly before making such major alterations and so I prefer to carry this work out during the dormant season when the tree is clear of leaves.



The newly pruned branch is then wired and reshaped as necessary.



At the beginning of the following growing season new shoots will begin to appear that in comparison to the existing primary branch-line are considerably thinner. Despite there being only 4 or 5 secondary shoots the branch already has a more aged appearance than before it was pruned, simply due to the massive increase in taper.



With just 18 months of rebuilding the branch ramification will have started to build up and when compared to its appearance after 5 years development, the illusion of age is very apparent. The process of rebuilding the tree can, in theory, be repeated over and over again for the duration of the life of the tree. This is likely to be a long time, leading to incredible taper and a magnificent illusion of age!

REDUCING THE TIME TO DEVELOP HEAVILY TAPERED BRANCHES

As bonsai enthusiasts, many of us are used to the concept of field-growing trees to greatly reduce the time taken to develop a trunk for bonsai. Allowing free growth in the trunk leader encourages the fastest possible thickening of the base and dramatic trunk taper in the future.

Exactly the same techniques can be used to create branch taper. Rather than then developing the trunk in a container as I have described in this chapter, the stump can continue to be developed in the ground, this time with the emphasis on building branch taper.

Though this increases development time in the ground and delays the transition of a tree into a bonsai pot by another 10 years or more, the long term results are branches of the highest quality in a shorter time frame.

Species Guide for Elm can be found at the end of Chapter 5 - Root over rock

Creating Bonsai From Trees Collected in the Wild

Bonsai can be, and often are developed from old trees collected from the wild. These will be specimens ranging in anything from 10 to 100’s of years of age that are dug up from the ground, taken back to the bonsai garden and allowed to recuperate before being developed as bonsai.

Yamadori or wild trees can make extremely high standard bonsai, however, collecting wild trees is not as straightforward a task as many beginner and intermediate enthusiasts may expect.

Successfully collecting and containerising a tree that has been growing wild in the ground for decades takes a lot of skill, patience and above all else, observation of and respect for the environment.

Trees of any kind should only be taken from the wild when permission has been granted, by the landowner and preferably only when accompanied by an experienced collector.

CHAPTER 13

ENGLISH OAK

Quercus robur/English Oak

Progression Series

The English or European Oak is found growing throughout Europe and in particular, in the UK. In the UK, it must be one of the most common deciduous tree species alongside Beech, Hawthorn and Birch. However, as with Birch, the English Oak can prove to be a surprisingly difficult tree to cultivate for bonsai.

Common problems with English Oak bonsai centre around their tendency to produce large leaves that many enthusiasts find difficult to reduce in size, and dieback of the weaker bottom branches and inner growth. Oak bonsai grown in their native climate are also prone to many diseases as well as attack from indigenous pests such as aphids.

The most common difficulty I have experienced with English Oak centres around its negative reaction to root disturbance. While finding most other UK natives relatively easy to obtain from the wild, I would find that Oak had a tendency to fail, those that did survive would sometimes suffer dieback of some, or all of, the branches. It was not unusual for the trunk of a collected Oak to die-back to be replaced by several suckers from the base.

My difficulties are not necessarily typical of the experiences of other enthusiasts who regularly collect Quercus robur; there will always be a myriad of subtle differences when collecting Oaks from different local climates, soil types and habitats. However, my solution to collecting the Oaks I found growing in the soil around me was to actively ‘work’ on the roots during the growing season either after midsummer and/or after the first leaves begin to open. (Note: this is not typical of collecting trees from the wild).

The Oak that is the subject of this article was discovered in late summer growing in wet, marshy soil under the canopy of a much larger Oak. As a

result, it was growing in the leaf-litter of what was probably its parent tree, and I knew that the root system would be very likely to be compact. Trees growing in almost permanently wet or at least moist soil have no need to issue long roots in search of moisture, even during the drier months of the summer.

August 2002: the wild Oak found growing in the leaf litter of a large field-growing Oak.

August 2002: the Oak seen from the reverse side. After collection, the trunk would be chopped back to just above the first thick branch growing

towards the right.

The Oak was relatively young, probably between 10 and 20 years of age, and had a trunk diameter of approximately 2”/5cm. Thick enough for me to make a bonsai of 12”/30cm.

Having decided to collect the tree later in the year, I used a spade to cut a ring into the soil around the trunk base (trenching), the purpose of which was to cut through any roots that grow more than 15”/40cm away from the trunk in preparation for collecting as much of the resulting root system and being able to fit it into a container.

Cutting the roots now would hopefully result in the ‘pruning’ wounds on the root-tips having time to heal and even generate new finer rootlets while the tree was still otherwise undisturbed in the ground. With the roots still active for another 2 months, my timing also gave them time to recover from the shock of being severed. August in the North West of the UK is relatively wet and humid, and I felt that the tree would still have enough roots left intact to supply the leaves with moisture. (Removing too many roots or even just interfering with the roots of some species at this time can cause the leaves to dry out as the tree is unable to supply enough moisture to them).

December 2002: The roots of the Oak after collection. Note that the ground-soil has been removed revealing that there are plenty of fine feeding-roots to sustain the tree during recovery and that I only severed a small number of thick roots when trenching the tree during the previous August.

I kept my eye on how the Oak reacted to my trenching over the next weeks until the leaves began to drop as usual in the autumn. 2 days after Christmas 2002 I returned to the land where the prepared Oak was growing and with the help of a spade, the Oak was dug up from the ground. Given the compact size of the previously trenched rootball, the Oak came up out of the

ground very easily. The rootball was wrapped in plastic packed with damp sphagnum moss to keep the rootball and surrounding soil moist and intact.

Once home I immediately began work on potting up the tree. The native ground-soil was removed by hand, but as opposed to standard practice with many deciduous species, I did not wash the roots. Oaks do benefit from a small amount of native soil being left around their roots due to the presence of beneficial mycorrhizal fungi. Several root-tips were re-pruned to give clean wounds that would heal better, and the tree was potted into a terracotta pot that was just large enough to contain the remaining root-system without any need for any further root pruning.

The tree was potted using a high-quality 100% inorganic soil, the use of which is highly important at this time to ensure optimum levels of air and moisture are available to the tree.

December 2002: Once potted up, the tree was left in a frost-free location for the remainder of the winter.

With the tree potted up, the trunk was chopped down, and any unnecessary branches were removed immediately. Any hard pruning of the top growth of a deciduous tree must be carried out as soon as the tree has been collected. Heavy pruning (using a saw for instance) while the new roots are still immature can often cause the trunk to be rocked around in the soil and the delicate new roots damaged. Heavy pruning immediately after collection also saves years of time developing the tree into a bonsai.

Once the tree begins to bud out in the spring the tree cannot be heavily pruned again for a minimum of 12 months as the removal of large amounts of new growth would be too much of a strain on the tree's already heavily depleted resources.

And so it is advantageous that any new growth that appears can be used towards development of the new branch structure and/or trunk line rather than simply needing to be removed again at a future date once the tree has fully recovered from collection.

The Oak was then placed in a dry, cool but frost-free environment where the soil could be kept damp but never too wet.

June 2003: After leaf-break in late spring.

June 2003: compared to other deciduous trees, Oaks burst into life very late in the spring and my newly collected Oak was no exception. By the beginning of June, it had leafed out well; producing several new leaves and most importantly, new shoots.

Newly collected trees will almost always issue at least a few new leaves

during the next growing season, simply from resources stored in the trunk. However if there are not enough viable roots to supply enough moisture to the tree, these new leaves will begin to shrivel, dry out and die. On the other hand, the appearance of new extending shoots are a very good sign on a newly collected tree as they can often indicate that not only are the existing roots able to support new leaves but there has new root growth.

Oaks are prone to producing many new basal shoots and suckers from the base June 2003: After leaf-break in late spring of the tree after the trunk has been recently chopped and this Oak was no exception. Leaving the suckers in position would have deprived other areas of the tree of resources that I wanted to be focused on growing a new trunk-leader and branch structure.

As soon as there were enough new shoots in the upper part of the trunk for me to be confident that the tree would survive, the suckers were removed. However, if there are few or no new upper branches present on a newly collected tree, there is a danger of the tree failing, and the suckers should be left in position in an effort to simply keep the tree alive.

As already mentioned, disease can be a problem on Oaks; my experience is that they are only a problem on trees with an underlying health issue that causes them to be too weak to resist common air- and water-borne diseases.

A newly collected tree that has been moved to a new environment and had its roots severely disturbed and/or greatly reduced during collection will naturally be weak in the year or two after collection. With Oaks, there is a particular susceptibility to mildew (a white fungal attack of the leaves) and attacks can occur as soon as temperatures begin to rise in May. To prevent mildew, a preventative fungicide was applied from leaf-break until the leaves had hardened off fully, later in the summer.

With the tree having survived collection, it was then allowed to grow for 2½ years while it recovered fully regained its vigour.

October 2005 and the tree has regained its strength enough for me to have pruned it back twice during the growing season.

By 2005, the Oak had fully regained its vigour, and I was able to prune it back twice during the growing season and due to this, the branch structure was beginning to develop well.

At this stage growth was very coarse; leaves were very large and new shoots would extend a long way leaving long internodes. This is typical of Oaks that are in a juvenile state either because they are young or after hard pruning.

I was also a little worried about a ‘bulge’ in the trunk base that theoretically meant the trunk had reverse taper; something to be avoided in bonsai as it can destroy the sense of proportion and age.

The bulge was in fact, an area of the trunk that had been under soil-level while the tree was in the ground and from the numerous dormant buds that could still be seen in the area, it is likely that it would have been a source of a high number of suckers if permitted.

I had allowed two new shoots to grow from above the bulge in an effort to try and thicken the area below it and remove at least some of the inverse taper. I had also seriously considered carving the bulge and turning it into a

deadwood feature such as a large uro. But neither option seemed to be the answer to my dilemma. The two low shoots were not vigorous, and it was unlikely that they would thicken the trunk base in anything less than a decade and I did not like the idea of unnecessarily creating a large wound on an otherwise scar-free trunk.

September 2006 and the Oak has been potted into its first bonsai pot from Erin Bonsai.

Throughout the growing season of 2006 the Oak continued to go from strength to strength and I decided to put it into a bonsai pot.

The Oak was repotted in early September 2006. This is a bad time to repot many tree species, but as discussed earlier, Oaks seem to respond more favourably to root interference at the beginning or the end of the growing season rather during dormancy.

As the bonsai pot was slightly larger than the training pot in which the tree had previously been growing, it was simply placed into its new home, and the roots gently arranged to fit with very minimal root pruning. Due to their tendency to coarse top growth it is preferable to keep Oaks slightly root-bound and for this reason the roots were only cut where necessary.

As for the bulge. By this time, I had come to realise that actually, the only thing that bothered me about the bulge was the fact that there is a general guideline in bonsai that inverse taper is a bad thing and the bulge did not

actually make the tree look ugly or immature. So rather than address an issue that was of no real concern to me personally, I decided to simply leave it alone and not worry about it!

September 2007: A year later and leaf-size has been dramatically reduced.

September 2007. A year later and the appearance of the Oak bonsai has changed dramatically. Using very simple techniques, both leaf-size and shoot extension had been reduced by at least half creating a much more compact growth habit.

May 2008: In the Spring of the following year, the Oak opened its fresh new leaves and the increase in ramification, and decrease in leaf-size, was immediately obvious. Oaks can produce a vibrant red colour to their leaves just as they begin to open that then turns to a fresh green colour. This contrasts beautifully with the solid grey of the trunk and the matching colour of its bonsai pot. As for the trunk-bulge; I have learned to love it!

Oak do quite rightly have a poor reputation for coarse growth and many enthusiasts struggle to refine Oaks as bonsai. However I discovered that while complete defoliation (removal of all of the leaves) can result in even larger leaves and on weaker trees dieback of lower branches, partial defoliation is a very useful technique to employ. All large or over-sized leaves that appear on the tree throughout the growing season are removed immediately.

Oaks typically produce a terminal cluster of buds (at the end of an extending shoot) that will carry anything from 2 to 5 leaves. As soon as they appear in the spring or during the growing season, the number of leaves (or buds if caught early enough) are reduced to just two, if possible, removing the largest leaves and leaving the two smallest leaves from the cluster remaining. Lower branches that are apt to slowly weaken over the years are allowed to carry more leaves per cluster or even not be defoliated at all to ensure their vigour is retained.

Finally, once or twice (depending on the overall vigour of individual specimens) during the summer months, when an Oak is growing fastest, entire branches are partially defoliated. All leaves are removed along the entire length of each branch except for a small number; for branches in the apex only one leaf need be left. Middle branches should have 3 or 4 leaves left along their length and on the lowest branches, many if not all of the leaves are left in position.

May 2008: Showing the fresh light-green leaves of spring.

Species Guide

Quercus robur/English Oak Bonsai

Quercus is a genus of about 600 species of deciduous, semi-evergreen

and evergreen monoecious trees and shrubs. Nearly all are slow-growing and long-lived species, some reaching heights of up to 40metres.

There are several Quercus species suitable for bonsai including Quercus cerise/Turkey Oak, Quercus petrel/Sessile Oak and Quercus robur/the English Oak.

The English Oak is a slow-growing and long-lived deciduous tree closely related to Q. petraea (Sessile Oak). It is native to most of Europe and areas extending towards Russia, Asia minor and North Africa. Lobed leaves are red/bronze as they open in early spring turning to a fresh yellow-green in spring before turning to bronze in autumn up to 5-15cm long with very small stalks. Oaks are famous for the fruits known as acorns that appear in the autumn but can also be observed to carry strings of flowers in the spring just before and during leaf-break.

BONSAI CULTIVATION NOTES

POSITION

Full sun and good air circulation. Protect from hard frost below -5°C. Shaded branches on Oak bonsai have a natural tendency to die-back.

FEEDING

A weak mixture every two weeks after first growth has hardened off in spring. Heavy feeding or feeding while the spring leaves are opening encourages coarse growth.

REPOTTING

Standard practice says that Oak should be repotted yearly as buds start to move in spring until the tree is 10 years or older, then every 2-3 years. However, I prefer to repot after the first leaves have opened or in early autumn while the tree is not in dormancy.

PRUNING

Trim new shoots and pinch out apical buds unless extension is required.

DEFOLIATION

Complete defoliation can result in larger leaves and on weaker trees, dieback of lower branches. Infrequent repotting helps reduce leaf-size as does the removal of apical/terminal buds before they extend in spring. I have had very good results from regular removal of all large leaves (except those on the weakest branches) and thinning of the foliage at the tips of branches. The tips of most Oak branches will produce a swirl of 4, 5 or more leaves; remove all but the smallest to prompt creation of a new flush of smaller leaves.

PROPAGATION

Sow seed outside as soon as ripe. Air-layering with difficulty.

PESTS AND DISEASES

Weak specimens are very susceptible to mildew problems unless good air circulation is provided, also oak wilt, aphids and gall wasps.

STYLES

Upright and slanting styles, multi-trunk styles, group planting in medium to large sizes. Suitable deadwood features including jin.

POTS

Glazed, light and textured earthy colours.

CHAPTER 14

TWIN-TRUNK HAWTHORN

Crataegus monogyna/Common Hawthorn

Progression Series

The Hawthorn as it was found growing in the ground, late summer 2002.

Finding wild trees that have potential for bonsai is not as simple a task as one might expect. Theoretically any tree with a trunk over 1”/2.5 in diameter, can be turned into some kind of bonsai, given a lot of skill and imagination. However, it should go without saying that the better the qualities of the wild tree, the better the bonsai will be.

Finding wild trees with trunks that have good bark, some movement (and not as straight as a pole) are a species that are suitable for bonsai growing in an area where legal permission to collect can be obtained, can take many, many hours of hunting around wasteland, countryside or mountains.

When collecting Hawthorns in the Northwest of the UK, my annual routine was to spend several months during the growing season simply looking for trees with potential as bonsai, noting their position in some way, so that I could return during the following season to physically prepare them

for collection.

Trees growing in the wild are rarely as prominent as the Hawthorn in this Chapter. Often it is necessary to search through hedges and thickets consisting of dozens of trees just to find one tree that has potential.

I found this Hawthorn (Crataegus monogyna) in the late summer of 2002 while out walking and hunting potential material to collect during the following winter and spring.

When trying to find suitable material for bonsai in the wild, it can be difficult to decide exactly which features mean that a tree has or has not potential for bonsai.

Most importantly for deciduous trees, the quality of the trunk must be considered. Look for those that have good movement and are not too straight (often a problem with wild Hawthorn), have mature bark and good trunk girth.

Often (but not always), the branches that exist on the tree in the wild will need to be regrown as they are often too heavy or badly positioned for the final bonsai design.

A common mistake made by those new to collecting, is to take home trees that have fantastic branch structure ramification, without consideration of the trunk or whether the branch structure is low enough on the trunk to be usable for bonsai.

(I would also note here that a problem particular to Hawthorn is that any remaining low growth, frequently consists of flowering branches and spurs that will not produce the new flushes of vegetative growth necessary for the construction of new branches in the future.)

Finally, consideration must be given to the likely-hood that the tree can be collected and successfully nurtured back to health. Trees that are already weak in the ground will not react well to the stress of collection. Hawthorn (and many other deciduous trees) will grow very thick long tap roots with little of the fine feeder roots required for survival when found growing in dry,

open soils. This makes them much more difficult (and sometimes impossible) to collect successfully.

On the other hand, trees such as the hawthorn in this chapter found growing in soils that remain wet, moist or boggy even during the growing season will have much denser, more compact root-balls and are considerably easier to collect successfully.

For this reason, it is always a good idea to have a good idea of the type of soil in the local area, and the soil that a wild tree is growing in.

Surrounding vegetation will often leave clues as to the type of soil, and more importantly, how dry the soil is for much of the year. For instance, areas of land with plenty of mosses (low-growing species in the summer and sphagnum mosses in the winter) indicate wet soils.

The growth habit of different trees of the same species is also good indicators of the soil type as well as the root system of a tree.

Hawthorns with many low branches, good movement and ridged bark (from growing in a hot, moist environment surrounded by mosses and grasses) will invariably have more compact root-systems that make them easier to collect.

Alternatively, Hawthorns with very straight trunks that do not begin to branch until higher up the tree will very often have a root system that is a mirror image. In other words, there may be thick ‘taproots’ that plunge deep into the soil surface before dividing into smaller roots. These trees will not have a compact rootball and can be a nightmare to dig up successfully, and can take many years to fit into a bonsai pot.

Having marked the tree in the summer as having potential for collection, I left it alone until late autumn of 2002.

December 2002: the recently chopped Hawthorn photographed on a cold winter's day.

December 2002: Close up of the chopped Hawthorn.

When the leaves had dropped, and the bulk of the tree's energy was safely stored in the root system and trunk, it was time to chop it back hard to what I considered to be the future trunkline.

In the following spring, I would trench the roots to try and promote a more compact rootball to form during the growing season of 2003 before collecting the tree a year later in the spring of 2004. The more roots that I could collect with the tree, the better its chances of survival, it was worth waiting another year before collection it increased the chances of survival of the tree.

The reason for chopping the tree at this time, was that while the tree was being given another growing season in the ground to develop a more compact rootball, I might as well use that time to begin development of the top

growth, as well.

As already discussed earlier in this book, the result of chopping back the tree hard would be to establish a trunkline and prompt many new buds and shoots from the lower trunk that could be used as branches in the future. I waited until plenty of new buds had appeared all over the trunk in the Spring before digging a trench approximately 2 ft around the tree; the equivalent of a rough root-prune cutting through the largest and thickest of the roots that have travelled more than 50-60cm from the trunk base.

May 2003: The Hawthorn produced new shoots all over the trunk.

May 2003: With the tree trenched successfully in March as new buds had appeared, the tree began its recovery. By the beginning of May, the tree was covered in many new shoots that already extended by several inches. The colour of the most vigorous shoots are often tinged with red as can be seen in the image

July 2003: From May onwards I tried to make a habit of visiting this (and several other similar trees I had in development) on at least a fortnightly basis to ensure they were healthy and developing well. The Hawthorn was fed with slow-release granules to encourage maximum recovery and growth. I also kept a watch for aphid (green or black-fly) infestation. When a tree is stressed

or has received major trauma (as this one had after heavy chopping and trenching) it will release stress pheromones that will attract insect attack, particularly by ants that will carry the aphids onto the tree to extract the sap.

(Ants often ‘milk’ aphids and there is a well-known farming relationship between them. By stroking the aphids with their antennae, the aphids are made to secrete a sugary substance to the ants. In return, the aphids gain the protection that results from having the ants present.)

On many occasions, I have had a recently chopped or trenched tree being attacked by ants that have completely ignored all other surrounding trees and vegetation! The easiest way to wipe out a heavy ant/aphid infestation is to literally take a bottle of contact-insecticide out into the field with you!

In autumn 2003 after a great year of strong and vigorous growth, the leaves fell from the tree, and I pruned it back heavily again, leaving only growth that I felt was suitable for the development of the tree as a bonsai. At this stage, I seriously considered chopping the trunk down to the lower thick ‘branch’ to create a shorter tree with greater taper.

There is a school of thought in bonsai circles that a bonsai with two distinct trunks should divide at the base only; however, I felt that the tree had more character and looked more natural and to this day I am so glad I did not take the decision to chop the tree or remove the lower trunk.

February 2004: The Hawthorn was collected.

In February 2004, I finally dug up the tree, collecting as many of the roots as possible before bringing it home and being planted up.

As can be seen in the image above, the two largest roots had had to be pruned back quite hard in order that the tree would fit into the 18”/45cm wide terracotta bulb pan. However, from experience I knew that there were just enough fine feeder roots to support the tree when it started back into growth in the spring.

While collecting the tree, I had been a little shocked to discover that at first there seemed to be no roots growing underneath the surface roots that I had been able to see, while the tree was growing in the ground.

However as I dug lower into the soil I started to find that there was a much better root system growing about 12”/30cm underneath the soil surface, using this ‘second’ lower nebari gave the tree some considerable trunk flare and a much better nebari (surface-roots). The scars where the top surface roots were removed can still be seen in the image above.

The newly potted tree was placed in a shady frost-free position with a little bottom heat (provided by a soil warming cable), to aid root growth.

February 2004 and the Hawthorn was finally collected and potted up.

During 2004, the tree was very slow to bud and leaf out; not unusual for a newly collected tree. However, by midsummer it launched into growth and produced many new buds and shoots. It was now time to allow the tree to grow strongly and start developing the branch structure, the top of the trunk also needed to be regrown to create some convincing taper.

Summer 2005: The hawthorn growing in my garden to develop the new trunk leader.

In the spring of 2005, I planted the tree into my garden in a ‘growing bed’; an area of much improved and heavily fertilised soil where maximum growth (and therefore thickening) of the new trunk-leader could be achieved in as short a time as possible.

Whilst it might seem strange to go through the efforts of collecting a tree from the wild to pot it up for a year and then plant it back into the ground again, there were subtle but significant differences between the growing environments. Firstly, with the tree growing in a high quality (peat/bark based) soil in my garden, growth rates would be greatly improved when compared to the heavy clay that the tree grew in for most of its life. In my garden, the tree could also be fed and watered well. However, during the year's transition between collection (and the removal of a large percentage of the root mass) and being planted into the ground in my garden, it was very necessary to have the tree growing in a pot where the tree’s growing

environment could be controlled 100%.

While growing on in the ground in my garden the Hawthorn continued to be developed as though it was a bonsai in a pot. The branch structure was being developed as normal; the branches being allowed to grow before then being pruned back according to their position on the tree. Branches and new shoots were also wired to give them movement and good placement. However, greater care had to be taken to ensure that the wire did not cut into the branches due to the faster growth rates attained by the tree while growing in the ground.

December, 2005. The Hawthorn still developing in the ground.

December 2006: Two years later and the tree was dug back up out of my garden and replanted back into the bulb-pan.

December 2006: Two years later and nearly 3 years after being collected from the wild, the tree was dug up out of my garden and replanted back into the bulb-pan.

With the new top section of the trunk fully developed and many new branches having appeared all over the trunk, the tree had finally started to look like a bonsai!

November 2007: the Hawthorn is finally planted into a bonsai pot.

November 2007: the Hawthorn grew well throughout the growing season of 2007 and in the August of that year I ordered a large rectangle pot from Erin Bonsai for it. Just as the leaves began to fall in the autumn, the tree was

lifted from its training container, and planted into the bonsai pot. This was done with minimal root disturbance. The bonsai was then given its autumnal prune and wiring.

April 2008

April 2008: In late April the new spring buds of Hawthorn have extended and begun to open revealing the fresh green of the young leaves as they begin to unfurl.

My efforts during this and future years would be to increase the size and taper of the relatively young branches; keeping to a strict regime of allowing growth before pruning back according to each shoots position on the tree.

August 2008: Hawthorns are a species that are very vigorous and will have several flushes of growth each growing season allowing for rapid development of the foliage mass. By the late summer of 2008, the canopy had filled out well. In the images above, the bonsai can also be seen from the right hand side, and it is possible to see how the tree is developed to lean gently forwards and create a sense that it is towering over the viewer.

June 2009: 7 years after being discovered growing wild in grasslands in the north-west of the UK the Hawthorn has turned into an impressive 27”/67cm tall bonsai. With a trunk diameter (above the base) of 3.5”/8.5cm, a muscular and rugged trunk and fully developed foliage mass, the tree looks older than its (estimated) 60-70 years.

CHAPTER 15

COMMON HAWTHORN

Crataegus monogyna/Common Hawthorn

Progression Series

Hawthorns growing in an area of grasslands, in the North-West of Britain. On the upper image Hawthorns in winter showing their red berries with a foil of silver birch trunks behind.

The white flowers of the Common Hawthorn. Image courtesy of Claire Simpson.

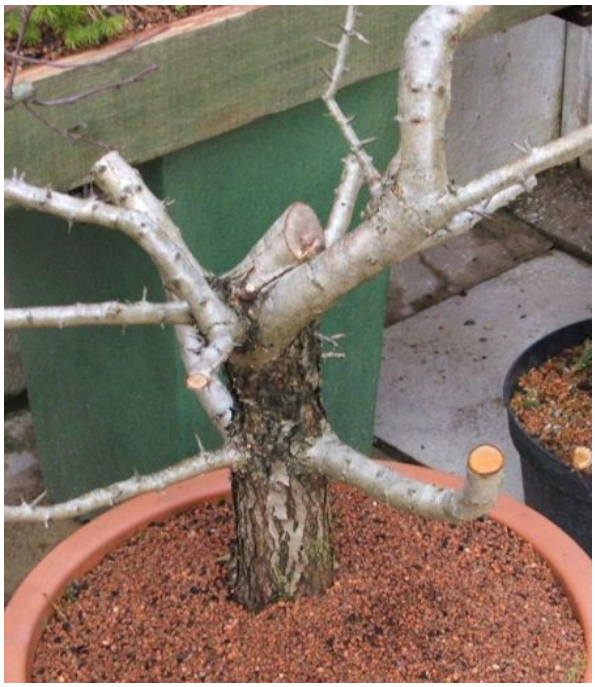
The Hawthorn that is the subject of this Chapter was collected in January 2006. I had noticed it growing in very wet marshy soil several years before

and had been taken by its naturally short, stout trunk featuring some superb mature bark.

I also knew it would be a difficult tree to style into a bonsai, and for this reason, had never taken the time to collect it. One of the principle problems with the tree was that the lower trunk split into two heavy branches/trunks that grew side-by-side so closely that they had almost ‘grafted’ together.

The primary branches (growing directly from the trunk) were already thick enough to enable me to create some great branch taper. However, many were also too straight or had awkward movement.

The primary branches (growing directly from the trunk) were already thick enough to enable me to create some great branch taper. In most cases they were also too straight or with very awkward movement.



January 2006: Upper; newly collected Hawthorn after bare-rooting and potting up. Lower; Close up of the Hawthorns 'twin-trunks' and also the peculiarly shaped low branch.

How would I be able to bend branches of over 2cm on already very strong Hawthorn wood?

By the beginning of 2006, I felt I had learnt enough techniques to overcome these problem areas of the tree. It was collected with an excellent compact rootball, and planted into a terracotta pot using a mixture of sphagnum moss and inorganic bonsai soil. One of the new techniques I had learnt was how to create realistic deadwood on deciduous trees, specifically uro on Hawthorns. Uro can be used to hide large wounds and so, with a view to being carved in the future, the larger of the two upper trunks was pruned back to a stump. The tree was then put to one side where it could recover from collection.

July 2006: Just 6 months later and the tree had regained much of its vigour. By this time, I had decided that this would be the front of the tree due to the form of the nebari, the shape of the trunk and also because the top section of the trunk grew towards this direction.

By July 2006, just 6 months after collection, the Hawthorn had recovered extremely well from collection. Sometimes trees will barely seem to notice the trauma of collection and the Hawthorn, having had such a compact rootball that I was able to collect a large amount of the roots, was certainly a tree that responded by issuing many new buds and shoots from all over the trunk that all grew with great vigour. So much so that I had been able to start selectively pruning the new shoots at midsummer.

In the image above, it is possible to see clearly the problems I faced with regard the primary branches. Whilst I did not require the lowest branches to grow downwards, these branches had a particularly ugly banana-shape!

By this time, I had decided that this would be the front of the tree due to the form of the nebari, the shape of the trunk and also because the top section of the trunk grew towards this direction.

I had also decided that I wanted the first branch to be the lowest branch on the left as the top of the trunk also grew in this direction; the thick branch on the right would need to be removed and hollowed out to hide the resulting wound.

October 2006: I decided that the tree was strong enough to withstand having its thick primary branches bent.

In October 2006, I decided that the tree was strong enough to withstand a technique known as 'notching'.

The lowest branch had already been removed (but as yet not hollowed out), and it was now time to try and bend those thick primary branches.

HOLLOWING

The Basic Principle of Weakening Branches in Order to Bend Them

As with a tree trunk, tree branches consist of a live layer of living tissue (immediately below the bark) that surrounds a 'dead' wooden core. The core of a branch (or trunk) simply exists to provide the branch strength and structure. This structure supports the live tissues that run around it, holding the foliage in position and is strong enough to support the branch so that it does not collapse under its own weight, even when snow laden or buffeted by winds.

It is this inner core of dead cells or wood that we are trying to work against when bending a branch. It is also this 'deadwood' that we can weaken or remove in order to bend the surrounding living tissues and therefore, the branch.

There are a number of techniques for weakening a branch's structure so it can be bent; all should be considered 'advanced' and only used with great care and experience. All should be considered risky techniques that can lead to the demise of the branch if care is not taken.

'Notching', 'Hollowing', 'Splitting' and 'Channelling' must only be carried out on healthy trees and vigorous branches that are strong enough to heal and recover from major trauma. One major downside with these techniques is that they often produce large wounds that may not ever heal over. Such wounds should be made so that they are out of sight of the front of the tree and 'dressed', if possible, to be made to look like natural deadwood features such as a 'uro' (hollows) or 'shari' (lengths of natural deadwood often seen on coniferous species such as Pine and Juniper).

Timing

The techniques described in this article all cause major trauma to the branch that is to be bent.

The concept held by some enthusiasts that carrying out major work on a tree, hollowing during the Winter when it is dormant or 'asleep', almost in an effort to 'fool' the tree, is wrong and a little misguided.

If carried out in the early-mid winter when the tree is dormant, the damaged area will not heal until the tree has returned to active growth, weeks or months later. This will leave the wound(s) exposed to frost and further trauma for too long a period. For this reason, these techniques should always be carried out during the growing season while the tree is in active growth and the threat of frost damage can be kept to a minimum.

For the majority of tree species, the best timing is from midsummer to late-summer or very early autumn when the first frosts are not due for at least 6 weeks.

By midsummer, a tree will have extended the new leaves and shoots of the growing season and will be at its strongest and most vigorous. Work carried out from mid to late summer will allow the tree to heal quickest, reducing the risk of dieback or infection in the tree without interrupting growth.

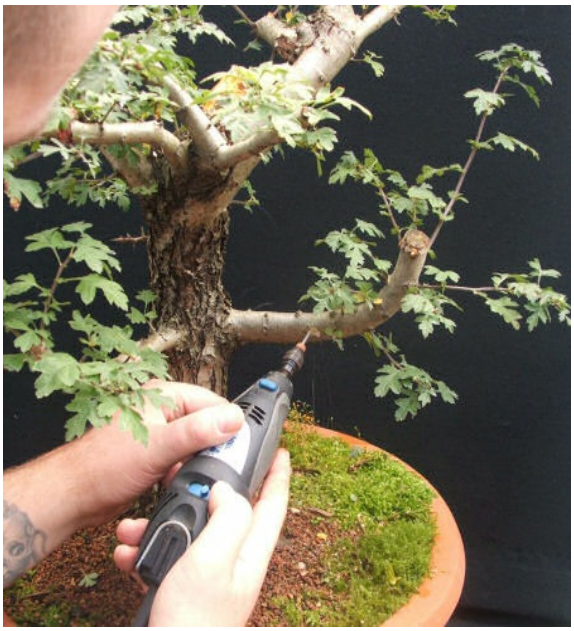
For resinous coniferous species such as Pine or Spruce, work should be carried out in late summer when sap flow is reduced. For deciduous species that have a tendency to bleed, these techniques should be avoided during early spring before leaf break or bud extension.

Above all, always try bending a branch with coiled wire and/or guy wires before using these techniques. When a branch is so thick or brittle that it can still not be moved into a new position, its structure must first be weakened to make its manipulation by coiled or guy wire possible.

As already discussed; the Hawthorn first branch that requires removal of the awkward banana-shape and bending downwards.

Hollowing

The first branch of this Hawthorn required some movement to break up the long, straight section, and to bring down the tip of the branch. As a short abrupt bend was required and a long wound (caused by Channelling) needed to be avoided, the branch was hollowed.



Hollowing out the branch with a Dremel fitted with a small router bit.

As much as possible of the interior wood was removed without damaging the cambium layer.

To hide the resulting wound, the hollow was made at the back of the branch using a Dremel with a small router bit. As much as possible of the interior wood was removed without damaging the cambium layer.

Having finished the hollowing, the branch was easily bent downwards using two guy wires to position the branch precisely.

The hollow was filled with sphagnum moss. This is not necessarily essential, but my hope was that the sphagnum would act as something of an insulator against the cold during the forthcoming winter as well as some cushioning to stop the now-thin walls of the branches collapsing and folding in on themselves too much as I bent the branch.

The first guy-wire was applied and I slowly started to bend the branch downwards...

...before a second guy-wire was applied to help make a more precise and more extreme bend.

The newly bent branch seen from the 'front' of the tree.

With the bend completed, the hollow was tightly wrapped with insulation tape to keep the hollow insulated, as well as to reinforce the area until it had a chance to strengthen naturally.

The healed bending point, seen from the front of the tree in late 2008.

A branch pictured in early 2009 that I split 3 years earlier

Splitting branches has many purposes in bonsai, but with this tree, it was to make a heavy branch near the apex of the tree, look thinner.

Unfortunately, no close-up image exists of the branch in its original state in 2006; however, the healed branch can be seen below left in the image from early 2009.

The splitting of this branch has left a large scar, but this is hidden unless observed from underneath the tree at a certain angle.

Splitting the branch along its length not only meant that I did not have to remove and re-grow this branch but also that I was able to bend the thinner (and weakened wood of) the branch in question.

Notching is simply a technique where the branch is cut across its width, and the branch is then bent into position. It is a very quick and

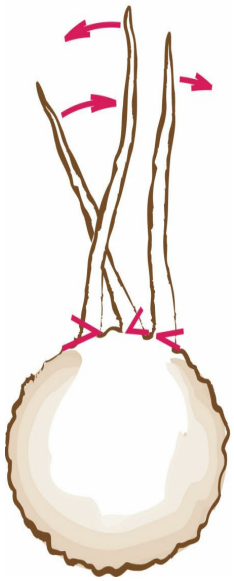
straightforward technique to carry out however it has a tendency to produce some callus swelling in the area of the notch.

This technique is also more suited to deciduous and broadleaf species that do not have as strict ‘life-lines’ as conifers (if a life-line supporting a secondary branch and/or foliage is entirely severed on a coniferous species, the live growth can and will dieback).

Branches must be wired or at least guy wired to hold the limb in place while the notch wounds heal and callus. Smear a coat of Vaseline around the exposed cambium of coniferous species or use cut paste on deciduous species.

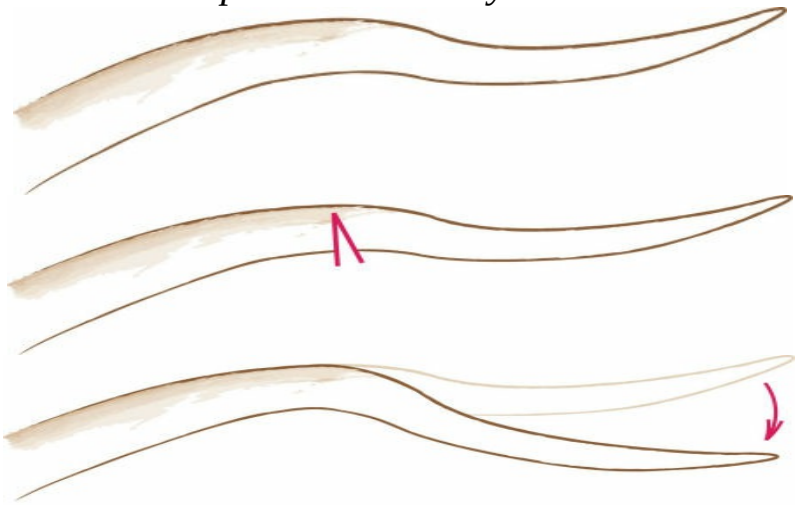
The Hawthorn featured in this Chapter had three back branches that grew at angles from the trunk that meant they crossed each other or were poorly spaced.

Each of the three branches were approximately 3cm in diameter, and would have taken a lot of time and effort to bend into position, using coiled wire or just guy wires.



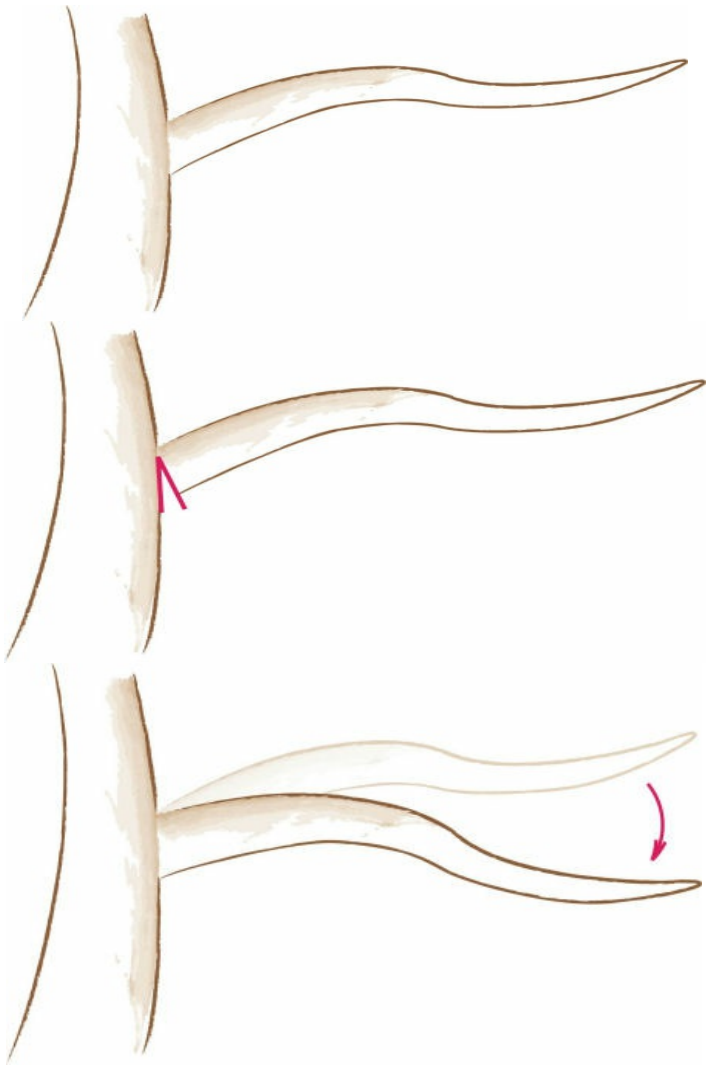
However, by notching the bases of each of the branches they were relatively easy to manipulate into position with the help of some guy wires.

Once the back branches had been moved into position, the guy wires were left on the tree for the next three years, until the branches had set into position naturally.

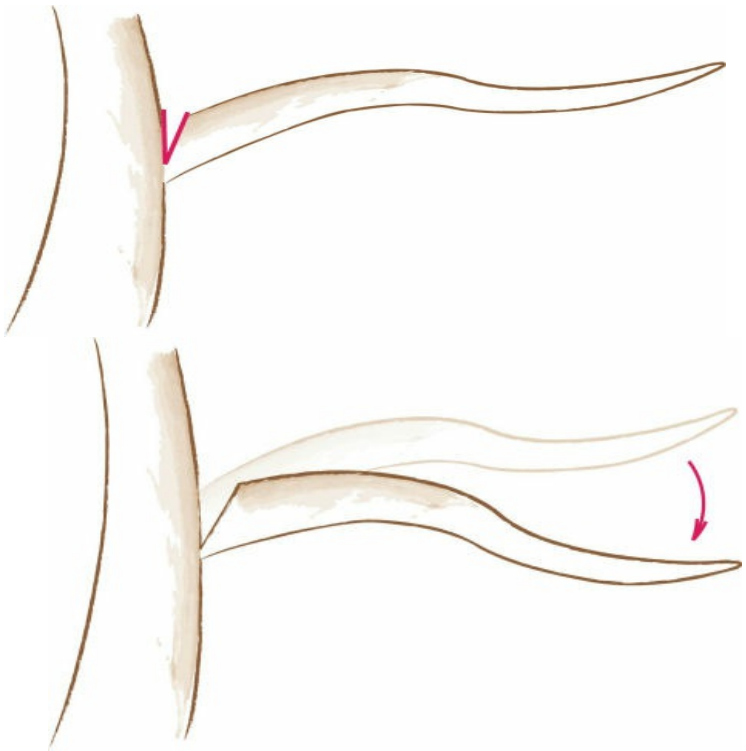


Two angled cuts are made approximately 2/3 of the way through the limb to be bent. If the cuts are not made deep enough, the branch will not bend neatly and cleanly, if at all. The notch is made using a thin saw and should form a triangular shape so that when bent, the two sides of the notch meet; as the resulting wounds callus over, they 'graft'/grow together.

Notching is useful for altering the angle at which a branch leaves the trunk of a tree. This can often be difficult to change with just wire alone.



The base of the branch can be notched at the bottom and can then be pulled downwards with coiled wire or guy wires. The sides of the notch are pulled together, and they will eventually heal together.



Some enthusiasts prefer to notch above the base of the branch, rather than below it. This leaves the notch open and visible until the notch calluses over and fills out the gap.

Ultimately, either method works well and should probably be used according to the attributes of the plant species it is applied to. Some species are slow to form sufficient callus to fill in the notch, and a bottom notch is preferable.

June 2009: 2½ years after the back branches were notched and the scars are only just visible through the naturally rough bark of the Hawthorn.

A Few Words of Warning...

Hollowing, channelling and splitting all carry the real risk of causing the death of a limb or even the tree itself if not carried out correctly, and the correct aftercare provided. These techniques should be considered as advanced and only carried out on healthy, vigorous trees and limbs that are able to respond to such invasive work.

Protect wounds using your usual method, be it with wound sealant or otherwise. There is debate currently as to the necessity of some or even all wound sealants. Personally I find a smear of Vaseline/petroleum jelly more than adequate to protect the exposed cambium.

When hollowing or channelling, remove enough wood from the branch to enable bending without splitting or otherwise damaging the outer bark/cambium layer, but leave enough wood to ensure that the branch has enough strength to support its own weight. Keep checking the flexibility of the branch as the wood is removed.

When removing wood from the centre of the branch, if the green of the cambium can be seen, you have drilled too far. Seal the cambium and

continue to remove wood elsewhere!

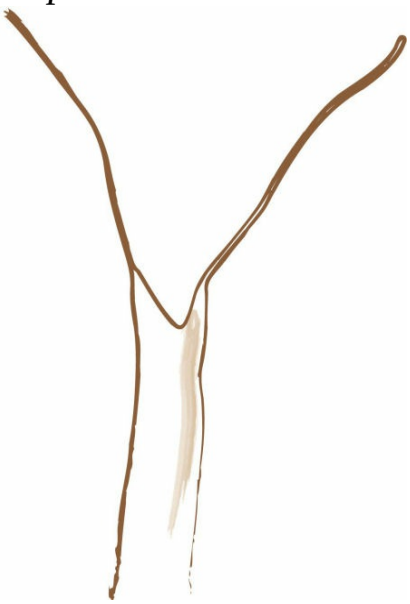
As with other techniques described in this series, the best time to carry out this work is in late Summer or early Autumn when the heat of the Summer has passed, and there is plenty of time for the wounds to start healing before the onset of frosts. Do carry out this work while the tree is active (in leaf) so that its response can be gauged immediately and so that the tree can respond to the work (by healing) immediately.

Be cautious; if in doubt, create the channel or hollow or split the branch, allow the wound to heal and then carrying out the bending and wiring, weeks or months later.

Finally, make sure these techniques are actually necessary. Always bend a branch using coiled wire, guy wires or other less intrusive techniques, if at all possible.

October 2006: Another problem I faced with the branches of this tree was that there was little taper along their length. They now needed to be cut back to new shoots that had appeared that growing season. As can be seen in the image above, the difference between the old and new growth was massive.

Simply making an oblique cut across the thick primary branch only accentuates the difference in taper.



But, making sloping cuts or a 'V' shape cut creates an impression of branch taper as when carving back a large trunk chop.

August 2007. The tree was pruned back having been allowed to grow freely all season.

August 2007: After so much work had been carried out on the branches in October 2006, I allowed the tree to grow freely for the first half of the 2007 growing season. New growth is the way the tree enabled itself to repair the heavy branch-bending techniques that had been carried out. After midsummer had passed, it was obvious to me from the sheer volume of new growth that the tree was still incredibly vigorous, despite everything, and I was able to prune back according to the future branch structure. Notice that there are certain new shoots that I have not pruned in order to encourage

them to thicken; particularly the long shoot growing from the lowest branch.

In February of 2008, I bought a new bonsai pot made specifically for the Hawthorn; the surface texture reflecting that of the rough bark of the tree. The tree was planted into its new home and another year of branch development began.

Image of the new pot by Vic Harris of ErinBonsai.com.

August 2008: the Hawthorn in its new bonsai pot.

By August 2008, the branch structure was being to take shape; the primary branches were now well established and the secondary branches were beginning to fill out the canopy well.

The heavy pruning wounds from removal and bending of the branches were also healing well.

Close-up of a healed uro created after a low branch (on the right of the tree) was removed in late 2006.

A ring of callusing can be seen to have formed around the edges of the wound but as has been mentioned before, it is unlikely that the wound will 'heal-over' any better than this.

The following year in May 2009, pleased with the very fast progress of the tree as a bonsai, I took a series of images featuring different aspects of the Hawthorn.

May 2009: Another carved uro, this time to hide a wound created when a large branch in front of the tree was removed. Notice that a large undressed wound still remains where I removed one of the original thick upper

branches/trunks.

May 2009: the bonsai seen from the back. The guy wires used to help set the primary branches in position in October 2006 have largely been left in position. Branches do seem to take longer to set into their new positions when using a guy wire, however, unlike coiled wire, there is little danger of the guy wires causing long term damage to the branches if left in position over an extended period. Notice the three upper branches that I had to notch to uncross and rearrange their positions in October 2006.

As anyone who has grown Hawthorn bonsai from seedlings or nursery stock will know, the bark of Hawthorns remain a smooth light grey for many years, taking as long as 30-40 years to begin to mature. One of the key features of this bonsai is the appearance of the bark with its plating and fissures an image if great age is created. The actual age of the tree is difficult to establish accurately. It is most likely to be around 50-60 years of age, due to the length of time the collection site had been allowed to grow wild. However, as with many tree species, Hawthorns growing in perpetually wet soil, surrounded by vegetation, such as grasses, will have mature bark at a

much younger age than their counter-parts found growing in dry soils or a bonsai pot.

May 2009: One of the highlights of the year are the vibrant green colour of the new leaves unfurling in spring.

May 2009: The upper section of the trunk and the surrounding foliage mass as seen from the right-hand side.

May 2009: And from the left hand side. Notice how the trunk leans towards the front view of the tree.

The final major work that was still required on the Hawthorn, was the

large wound in the middle of the trunk, where one of the original two large branches/trunks were removed after collection.

The stump left from the removal of one of the two trunks/branches after collection.

The same stump as seen from what is now the front of the tree, in late 2006.

November 2009: By this stage of the tree's development the wound had simply been 'smoothed' out so it followed the outline of the trunk itself when seen from the front view of the tree.

Though 'hidden' from some views of the tree I still wanted to dress the wound and turn it into something that was visually appealing from whichever direction it was viewed.

November 2009. Despite having been smoothed out a little, to follow the same contours of the trunk, the wound still existed and needed carving into an uro.

November 2009: the wound seen from the right hand side of the tree.

CARVING DECIDUOUS BONSAI

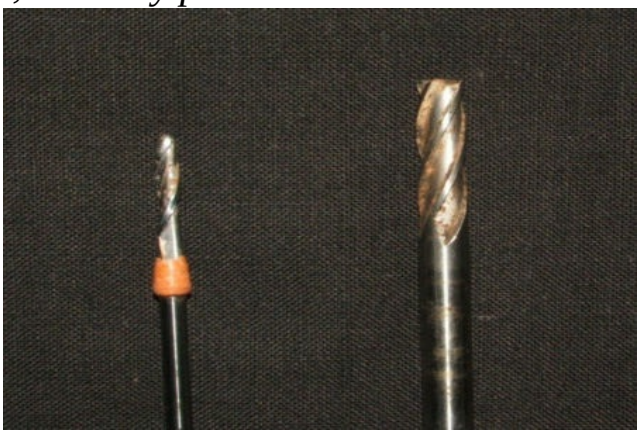
Bonsai enthusiasts have a range of electric carving tools available to them that are often very capable of removing large amounts of wood very quickly. The majority of these carving tools are circular 'bits' or attachments containing blades that when fitted into a high-speed rotary machine such as a Dremel or a die-grinder cut out a channel or groove from the wood. I used these attachments for a number of years but I was never happy with the

results that I produced, nor was I particularly impressed by the deadwood carving that I saw other enthusiasts and bonsai artists created.

I would find that the carving would simply consist of a number of shallow grooves (sometimes even of identical widths) but there was not the almost random shapes and patterns of real deadwood nor was there any depth to the carving. These circular attachments would indeed remove a large amount of wood in a short amount of time but they are only capable of removing wood in a very limited manner. In a search for a better way of using electric carving tools I tried a wide number of different attachments with varying degrees of success.

Finally, having exhausted the average bonsai carving-catalogue, I investigated furniture carving and found that it was common practice for professional wood carvers to use router bits; a few false-starts later I discovered what I feel is the ideal tool for carving bonsai. The ‘Mill-End’ router bit. ‘Mill-End’ is a generic term (rather than a brand name) for router drill bits that have a particular tip with the ability to cut straight into every type of wood with great ease, as well as being able to cut sideways.

A typical example of a rotary carving attachment intended for bonsai. As can be seen, it is only possible to carve to a limited depth.



Examples of mill-end router bits for a Dremel on the left and a die-grinder on the right. Note that the most important feature of these bits are the tips.

The wood of deciduous trees has different qualities than that of coniferous trees principally in that coniferous tree species have very fibrous wood that grows in distinct 'lines'. In other words, coniferous trees have a strong 'grain' that must be observed when carving.

This means that while the carving techniques and methods described in this chapter can be applied to coniferous species, the patterns and fibrous nature of such wood must be observed.

I immediately found that I had a tool that could carve any pattern or shape I desired with great ease. There was no need to press the attachment hard into the wood for it to cut and it gave me the ability to create what I wanted to; not what the tool would allow me to create. Mill-end router bits are incredibly cheap in comparison to the products previously available on the bonsai market; very hard-wearing and durable. They are available in a wide variety of gauges or diameters, and therefore, the correct size can be obtained to fit almost all high-speed rotary machines.

High-speed carving machines are essential for the router bit to cut into the wood; an ordinary domestic hand-drill does not spin fast enough to carve anything but very soft, rotten wood.

I currently use a Makita die-grinder, fitted with a large mill-end bit, for removing large amounts of wood in a short space of time ('roughing out') and a Dremel, fitted with smaller mill-end router bits, for all other carving work, including detailed carving. The standard Dremel machine is more than sufficient for carving of all woods (including very hard wood such as Yew) when fitted with the mill-end router bit.

November 2009: Armed with my Dremel fitted with a mill-end router-bit I started work on dressing the Hawthorn deadwood by carving it into uro's. The first area I carved was an existing uro that required further refinement.

The wood of different tree species will differ, as will the wood of differing individual specimens within the same species. Different areas of wood on the same tree will differ in how easy they are to carve, often dependant on how long the wood has been exposed to the elements and begun to break down and rot naturally. Hawthorn tends to have tough wood that softens and rots only after a decade or more; therefore it is necessary to run the Dremel at a higher speed to cut through it.

The Dremel model I use has variable speed settings on it, and this allows me to adjust the speed according to the strength of the wood. I try to use just enough power for the router bit to cut freely without being allowed to become uncontrollable or remove too much wood at once.

For the two small uro's pictured above I simply wanted to make the existing hollows deeper, and it was a straightforward case of pressing the tip

of the router bit against the back of the uro and allowing it to cut deeper. It is important to note at this point that router bits do have a habit of ‘skipping’ when the tip presses against particularly hard wood. Skipping occurs when rather than cutting into the wood; the tip suddenly travels across the surface of the wood and can lead to minor damage of the bark surrounding the area being carved. Often this damage is relatively superficial and leaves ‘scratch marks’ across the bark that do heal over time, however, for obvious reasons it is preferable to avoid the router bit skipping at all if possible

For this reason, notice how I am holding the Dremel; my right hand is holding the back of the machine, guiding it as I carve, while my left hand holds the machine near the tip, to stop the machine skipping in any direction.

With the work on the existing uro’s carried out, it was time to turn my attention to the large wound in the middle of the trunk.

The first cuts into the wood can be the most difficult to control as the router bit has nothing to ‘bite into’ at first and great care needs to made to stop it from skipping. (Note the newly redressed uro’s to the left of the image above).

At this stage, I am simply creating a rough outline of a deadwood design.

Within a couple of minutes, a large amount of wood has been removed. But how to decide what wood to remove and what wood to leave intact. How do you ‘design’ an uro or any other deadwood feature?

In nature deadwood is created ‘randomly’. That is, it is not designed by man or nature, it simply happens as a result of random forces such as rotting, wind or snow damage. Despite this random creation, natural deadwood nearly always looks ‘real’ and not man-made

On the other hand; man-made deadwood, that is, deadwood designed by man can often look artificial or ‘fake’.

I have found that it is important when carving deadwood to try and

introduce a random element and to try to avoid ‘designing’ the feature so that it looks as natural as possible.

This ‘randomness’ can be achieved by allowing the carving attachment to dictate what wood it does and doesn’t remove; very often the wood will have areas where it is softer, and the carving attachment will naturally move towards the softer areas of wood and away from the harder areas.

I have found that as long as the outer edges of the intended area to be carved are observed and are decided upon before work starts, it is very rare that carving ‘randomly’ produces poor results.

Once a basic random shape and pattern has been established, it is necessary to ‘embellish’ the carved area, re-carving areas of the wood where necessary.

1) Make sure that there is no symmetry in the piece. For example, make sure that any raised ‘lines’ of wood are not the same width. Make sure that any visible holes or ‘craters’ within the piece are not all of the same shape or size. Asymmetry is important.

2) There should be no perfectly recognisable shapes such as circles or ovals.

3) The deadwood area as a whole should not be a recognisable circle or oval.

4) Make sure there is plenty of variation in the depth of the uro’s across the piece as a whole.

5) Make sure that there is plenty of variation in the ‘highpoints’ in the carving.

6) The ‘walls’ of a carved piece should be concave and not straight or square. (A useful way of embellishing or improving carved areas is to carve recessed areas so that they cannot be seen entirely from the front of the tree).

7) All sharp or square edges and tool marks must be removed.

On the left of this carving, there are two symmetrical circles of the same size; by making their shapes more random and asymmetrical the carving on the right is improved.

Seen in profile view the carving on the left has straight walls and the bottom of the indentation is of a uniform depth.

On the right, the same carving has been embellished by making the walls concave, removing the sharp edges and making the bottom of the carved area a random depth.

With this particular carving of the Hawthorn wound, I wanted to keep the same smooth outline that would be largely hidden from the front view of the tree.

However, as previously described, I had no particular design intentions for the wood within the area that needed carving, and I allowed the router bit to find the softer more easily carved areas.

Periodically it is necessary to brush away the loose wood-chippings so that the carved area remains clearly visible.

Carving continues, all of the time trying to avoid symmetry and order.

Opening up the bottom of the carving, to stop it looking so circular. This is also useful for creating a drain for any water that might otherwise collect within the recessed areas.

Creating more depth on the left hand side of the carving.

With the bulk of the carving finished, it is necessary to clean away all of the loose wood as well as removing any remaining tool marks and sharp areas.

A small gas torch is then used to burn away the remaining debris in and around the carved area. Burning the wood also removes small fibres and burrs that can occur during carving.

Though burning the heartwood will do no harm to the tree, care must be taken as the heat will damage any live tissues including the surrounding bark and nearby foliage. If necessary, protect live areas with kitchen foil that will reflect away much of the excess heat.

When the wood has been burnt, it becomes black with soot and charcoal. An ordinary wire brush attachment on the Dremel is used to clean the wood.

The wire brush can also be used to smooth away any remaining sharp

edges and minor tool marks in the carved area.

Burning of the wood is an essential part of the carving process, not only

does it efficiently remove small burrs and catches in the wood that would otherwise require a lengthy amount of time sanding, but it remove moisture, and in fact, hardens the wood. The blackened areas then take on a natural aged grey colour after cleaning with the wire brushes.

The finished carving. The silhouette cast by the trunkline has not altered, but the obliqueness of the old wound has been replaced by a dynamic area of deadwood.

The carving as seen from the right hand side of the tree; by focussing the gas torch into the hollows of the deadwood and not cleaning away the resulting blackened areas as thoroughly as on the raised surfaces, a better feeling of natural depth has been created. Finally, on the right-hand picture, the newly carved wood seen from the rear/right of the bonsai.

July 2010: Nearly 5 years after being collected from wet grasslands the tree has come a long way in its development as a bonsai in a very short amount of time. Future years of development will concentrate on increasing the ramification, and the taper, of the branching. And enjoyment of the story that this tree already has to tell.

Species Guide

Crataegus monogyna/Common Hawthorn

Crataegus is a genus of 200 or more species of usually spiny, deciduous, occasionally semi-evergreen small trees and shrubs occurring in woodland and scrub in Northern temperate regions of the world. The leaves are alternative, simple or lobed and mid- to dark- green; some species produce good autumn colour turning yellow, red or orange.

Hawthorn flowers.

Many hawthorns have irregular, almost muscular trunks with complex patterns of ridging, which reflects their internal vessels. The bark is a dark-brown and has a tendency to peel off in large pieces. Commonly known for their very sharp thorns, their May flowers and following haws or fruit for which Crataegus take their common names of hawthorn or may. The haws are red in colour and follow the May flowering of white or deep pink colours depending on species and variety. Hawthorns can take a number of years to start flowering, trees grown in the ground taking up to 10 years and trees that are raised from seed in pots, can sometimes take as long as 20years.

SPECIES COMMONLY USED FOR BONSAI

Common Hawthorn/ Crataegus monogyna varieties also known as May, Quick, Quickthorn, Crataegus monogyna is a rounded, deciduous tree with a large number of thorns and broadly ovate to diamond shaped, deeply 3- to 7-lobed, glossy leaves up to 5cm long. Pads of 6-12 fragrant white flowers up

to 1.5cm across are borne in late spring followed by ovoid glossy, dark red fruit. Can reach heights of 10metres in its native Europe.

HAWTHORN/CRATAEGUS OXYCANTHA (syn.Crataegus laevigata)

Also known as May or Midland Hawthorn, the Crataegus oxycantha variety ‘Pauls Scarlet’ is a frequently used cultivar with its profuse, double, dark-pink flowers. (Confusingly ‘Pauls Scarlet is sometimes seen sold as ‘Coccinea Plena’). Slightly less vigorous than the Common Hawthorn, Crataegus oxycantha varieties of which there are many, can reach heights of 8 metres in their native Europe, India and North Africa.

CRATAEGUS CUNEATA/JAPANESE HAWTHORN

Very similar to Common Hawthorn but with white flowers. Reaches heights of 6metres in native South East Europe and Asia.

BONSAI CULTIVATION NOTES

POSITION

Full sun or semi-shade. Very resistant to strong winds and require a position with good air-circulation to help resist fungal diseases such as mildew. Though fully hardy when grown in the ground, Hawthorn bonsai require some frost protection from temperatures below -10°C.

FEEDING

Fortnightly with either high nitrogen to promote strong growth, or high phosphorus and potassium fertiliser to promote flowering and fruiting. In late summer use a low nitrogen feed to harden growth for the coming winter.

REPOTTING

Annually in spring as leaf buds extend in a basic soil mix.

PRUNING

Hard prune in late winter or early spring, wounds can take a long time to

heal over completely. Pinch out new growth in spring and through the growing season.

WIRING

Can be wired any time through the growing season though spring is best, older branches thicken very slowly so the wire can be left in place for long periods.

PROPAGATION

Remove seed from flesh as soon as ripe and sow outside. Softwood cuttings in summer and air-layers in spring. Surprisingly air-layers can take a long time to root (if they root at all); great care must be taken to remove every part of the cambium layer.

PESTS AND DISEASES

Caterpillars, aphids, rust and mildews.

STYLING

Suitable for all forms except broom. Suitable for all sizes.

Bonsai Inspirations 1

Thankyou for reading Bonsai Inspirations 1 by Harry Harrington

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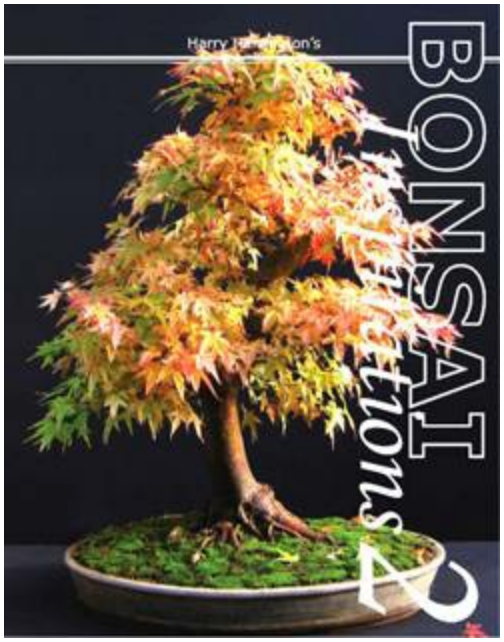

Bonsai Inspirations 2

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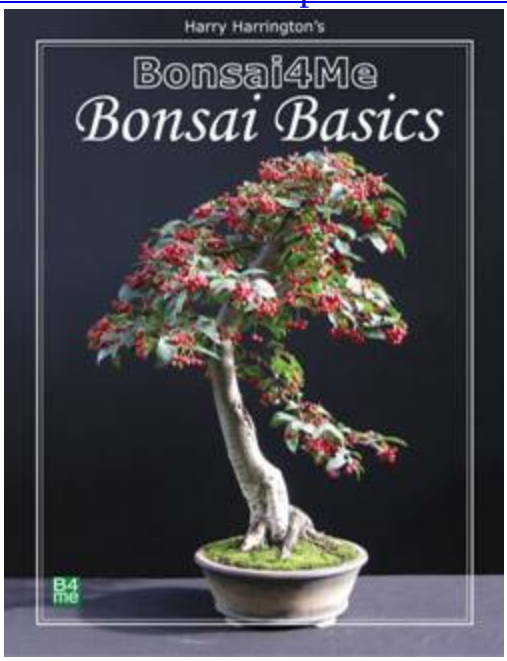

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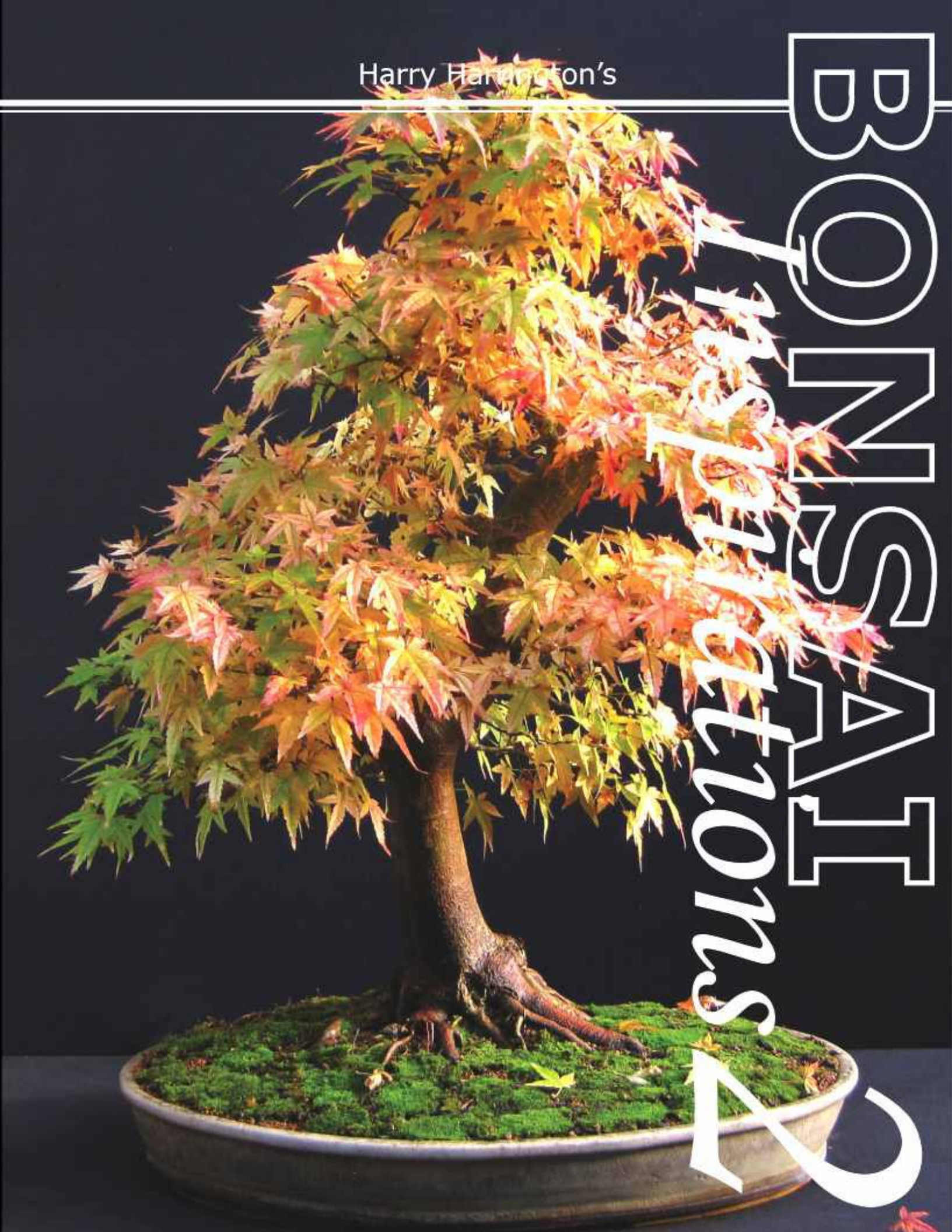
Harry Harrington's

BONSAI Inspirations



Bonsai Inspirations 2

by

Harry Harrington

Reviews of Bonsai Inspirations 2

5.0 out of 5.0 stars on Amazon.com

"Well written, easy to understand, great photos of great trees, what's not to like? The author is a real bonsai guy I totally recommend this book."

" I own a lot of bonsai books. Both bonsai inspirations 1 and 2 are some of the best I have read."

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".....It's a great book if you're like me, an advanced beginner, and you need more than the typical "how to" book."

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Foreword by the author

Bonsai4me.com was launched in October 2001, initially from a huge set of notes I had written in previous years, while I tried to decipher the enormous huge volume of conflicting and non-sensical advice offered to bonsai enthusiasts at the time. From just a thousand ‘hits’ in the first 3 months after it went live, Bonsai4me.com quickly grew as other enthusiasts discovered its existance and at the time of writing now receives over 1.5 million unique visitors every year from such diverse areas of the world such as the UK, America, Australia and even China and Japan, the spiritual 'homes’ of bonsai.

This second Bonsai4me.com publication is aimed at all bonsai enthusiasts, from complete beginners to professionals and is divided into six main sections; each detailing a different method available to the bonsai enthusiast to develop and maintain their own bonsai and bonsai collection.

Each section is then divided into chapters that each describe the progression of a bonsai over a period of time. These series of images that have become to be known as ‘Bonsai Progressions’, have long been a favourite source of education as well as interest and inspiration to visitors to the website.

The progressions were an idea I initially saw at the Internet Bonsai Club many years ago and being able to trace the step-by-step development of a bonsai and the turning of an ugly raw tree into a beautiful bonsai truly inspired me. I would return to these series of images many times and decided to start a record of the progress and development of my own work. There is a great deal of satisfaction in being able to look back over the years at one’s own work and artistry in this way and I would urge everyone to do the same with their own bonsai and raw material.

Finally, interspersed with each chapter are articles relevant to the progression of the trees including many techniques that I found almost liberating to my way of thinking when I read about them or discovered them during the many hours I have spent working on my bonsai over the years.

My hope is that having read this book, you the reader, will be equally inspired to go outside and create.

Harry

Bonsai Inspirations 2

After the publication of the first book, ‘Bonsai Inspirations 1’, I was taken aback by the wonderful reaction I received from readers as well as the critics. After many requests for a follow up book, I decided to sit down and write this second, follow-up, ‘Bonsai Inspirations 2’ in September 2011.

Bonsai Inspirations 2 is designed and written to be a book in its own right that can be read and enjoyed independently of Bonsai Inspirations 1.

To this end, there are some techniques and concepts from the first book that I have needed to repeat for clarity and understanding. But to repeat everything would simply dilute the enjoyment of return readers and I would encourage those new to Bonsai Inspirations to go back at some point in the future and read the first book, to maximise their acknowledge and understanding of bonsai.

Bonsai is an art form that crosses many social and political boundaries, where anyone of any background, financial means or horticultural ability can accomplish great living works of art.

And enjoy doing it.

Harry Harrington. December 24th 2011

Developing Your Own Bonsai

Though bonsai can be very daunting to newcomers when they first start out, in reality, bonsai is as simple as you make it.

There are many ways in which a bonsai enthusiast can obtain new bonsai (or material that can developed into bonsai by the enthusiast themselves), and this book illustrates just a small number of these methods.

Creating Bonsai From Field-Grown Material

‘Field-grown material’ is a general term given to a tree that is grown in the ground specifically for the purpose of developing as bonsai.

The main purpose of growing in the ground is often to allow the tree to grow freely so that its trunk fattens prior to development of the branch structure.

Field-growing is an excellent method of obtaining cheap raw material for bonsai and is a relatively fast way of developing a trunk (compared to saplings growing in pots and containers. However, it is not a quick-fix. Typically a sapling will need at least 5 years in the ground before its trunk is then suitable for development as a bonsai.

Many enthusiasts purchase material that has already been field-grown and this presents them with the artistic challenge of turning the material into a bonsai.

Chapter 1

Tilia cordata/Small-Leaved Lime or Linden

Tilia cordata/Small-Leaved Lime or Linden

Progression Series

Tilia Cordata as Material For Bonsai

Of the twenty plus species of Tilia, Tilia cordata, the small-leaved Lime or Linden as it is commonly known, is the most frequently used for bonsai.

A native tree in Europe, Asia and North America, Linden have heart-shaped alternate deciduous leaves that are a gorgeous bright lime-green colour in late Spring and early Summer, turning a butter-cup yellow in Autumn.

The new lime-green leaves of Tilia cordata in spring. Note the natural heart-shape of the leaf.

Historically the Linden is embedded in folklore. Since the Dark Ages, throughout Europe it was widely considered to have links to fertility as well as being a symbol of liberty. Historically, the blossom of the Linden was used to make a tea which was said to have a mild sedative effect.

In spite of its fast growing and thickening properties, the Lime still produces a tight wood-grain that does not splinter or deteriorate as many similarly fast growing woods do. For this reason it was widely coppiced for wood carving as well as for an energy source (for wood fires). This led to the spread of the Linden throughout Europe and America despite its reported poor reproduction from seed in the wild.

As bonsai, Linden are fast growing trees that are relatively quick to thicken and thick trunks can be developed within a relatively short amount of time. Back budding is easy even from the trunk itself, on trees with established branch-structures.

The thick cambium layer of the species enables rapid callusing (wound healing) akin to that of Larch or Japanese Maples. Whilst mature field-growing specimens eventually acquire a grey fissured bark, all but the oldest Linden or Lime bonsai are seen with smooth grey bark.

The one major drawback of the Linden for bonsai is leaf-size. At anything up to 8cm (3”) in length, its natural leaf-size is too large for smaller-sized bonsai. However, leaf-size can be reduced to around 3cm with increased ramification (foliage density) and the use of bonsai techniques such as defoliation.

June 2002: the Linden growing in a small terracotta pot.

The bonsai at the centre of this Chapter started its development during the winter of 2000-2001 as one of many bare-root saplings that I acquired. The bare-root saplings had been purchased with the sole purpose of developing in the ground as material for bonsai. With just a 1/2”/1.25 cm diameter, the trunk of the Linden was quite simply not yet thick enough for use as bonsai. Using the basic guideline that the height of a bonsai should be approximately 6 times that of the trunk diameter, the 1/2”/1.25 trunk diameter would have demanded a bonsai just 3”/7.5 cm in height. When the 3-8cm long leaves of Tilia cordata are taken into account, a 3”/7.5 cm tall Linden would not look very convincing as a bonsai!

So, along with a 100 or so other saplings, this particular tree was planted into the ground in a field I had access to, solely for the purpose of thickening

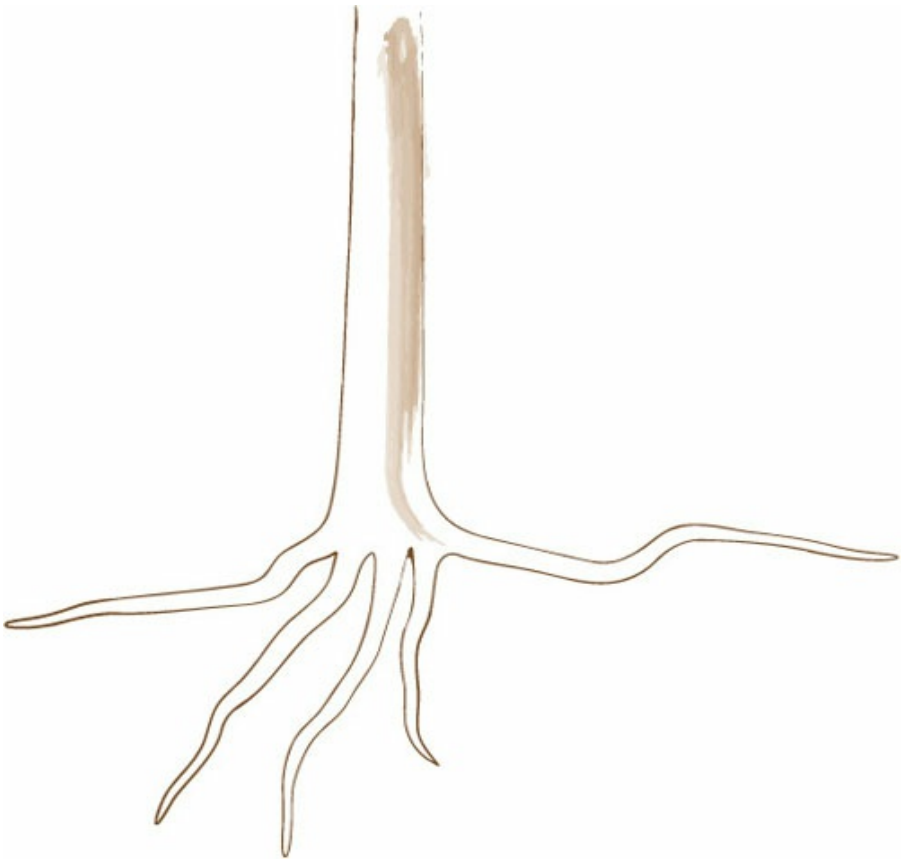
the trunk. (The subject of Field-Growing trees for bonsai is covered in detail in the Appendices at the back of the book.)

However, the following winter, having run out of available space in the field, the tree was dug up again and planted in a small terracotta pot with the intention of finding some space for it later in the year in my garden. Running out of available planting space was not an ideal start to the bonsai's development but one many enthusiasts can relate to!

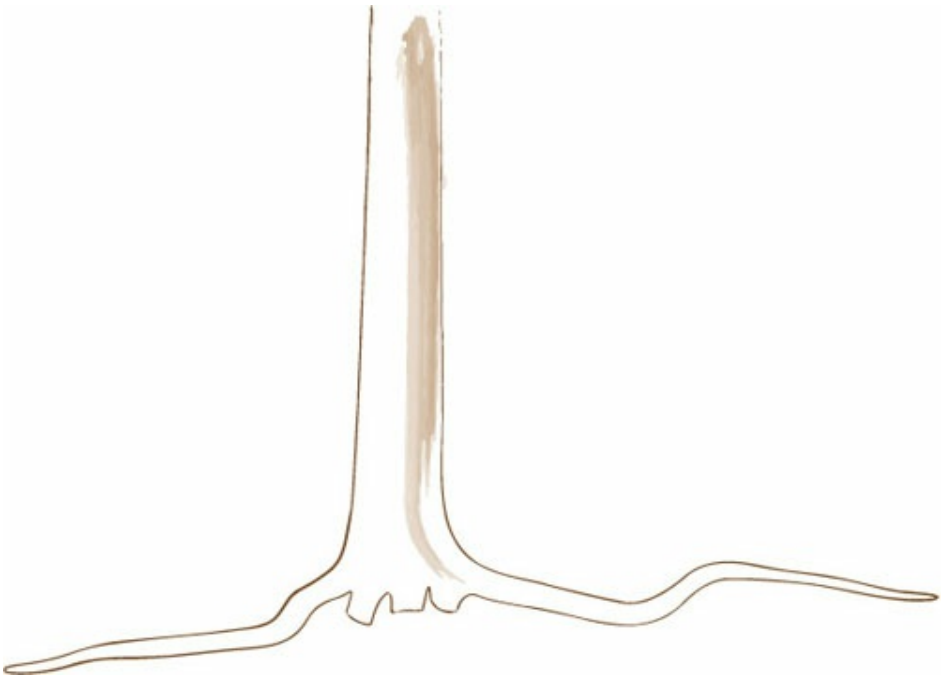
Around this time I was becoming increasingly interested in not just the formation of the trunk and branch structure of a bonsai, but also in the beauty of a powerfully built nebari (surface-root structure).

To encourage this feature in my field-growing trees, I began using a number of techniques including that of planting trees on top of ceramic tiles to encourage spreading, horizontal, root growth.

For saplings that already have a good spread of lateral roots, this means that the rootball is pruned so it is as shallow as possible and is then planted on top of a ceramic tile. As the tree grows over the forthcoming years, new roots are unable to grow downwards and instead grow outwards, producing pronounced lateral root formation.

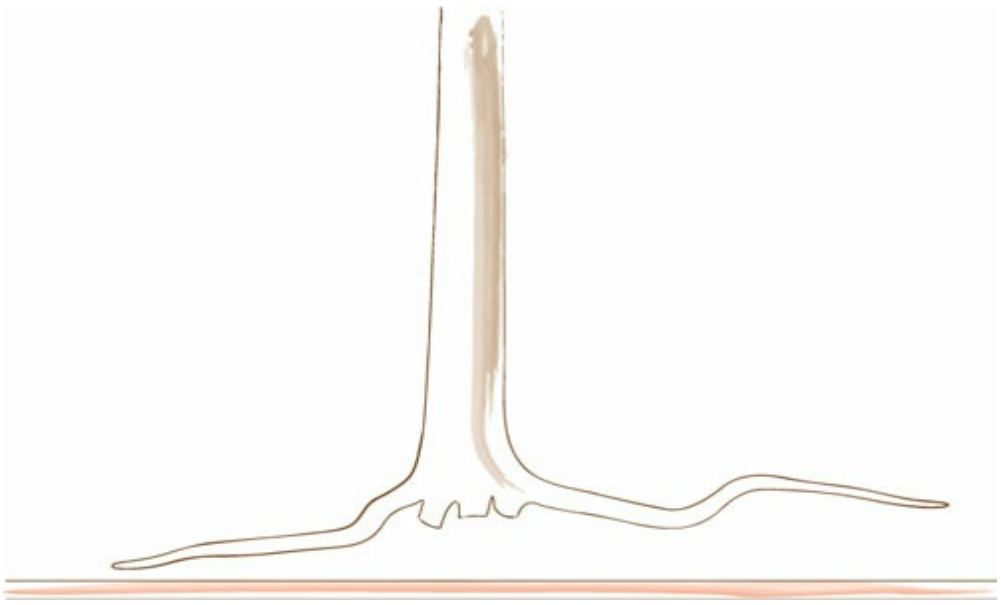


The roots of a tree with potential for good lateral roots, suitable for bonsai.

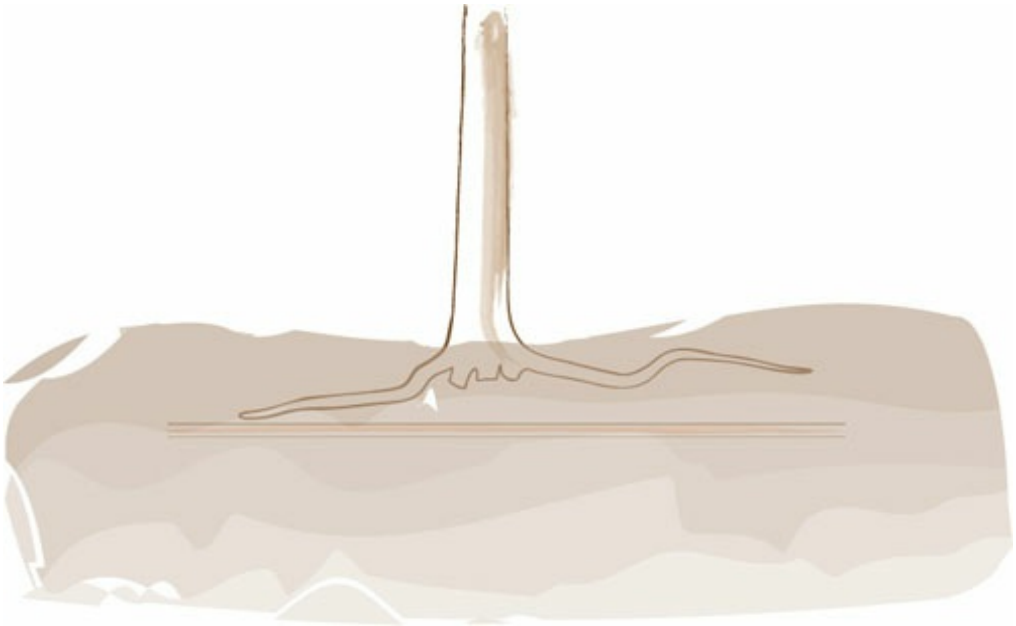


To encourage strong growth in these lateral roots, the downward growing

roots are pruned. The tree will then encourage much stronger growth in these roots now they are the most dominant (Prune these lower roots back hard at first rather than remove them entirely otherwise the development of the above-soil parts of the tree will be slowed dramatically).

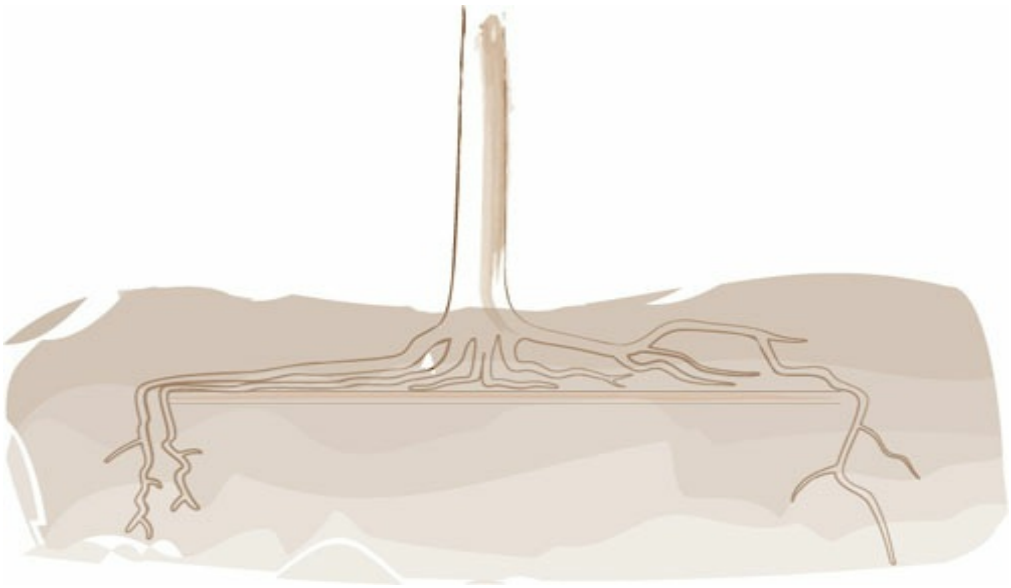


The tree is then placed on top of a ceramic tile in the ground. I have found that old ceramic tiles are the best root 'barrier' to use as they are strong enough to retain their shape and will not degrade in the soil.



Soil is then placed back over the root system. It is important that there is

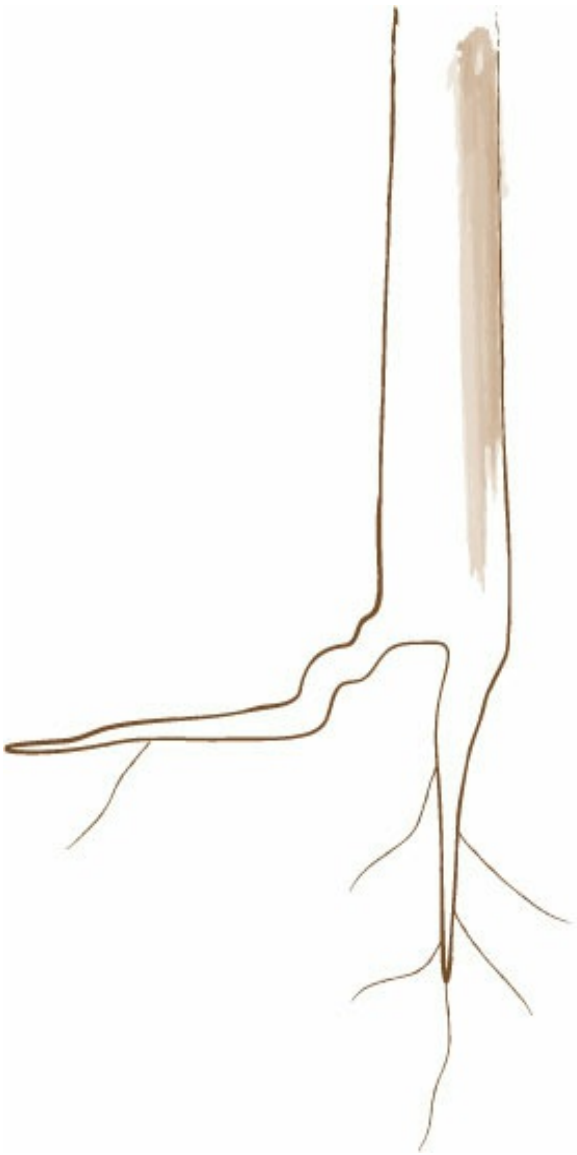
at least 6”/15 cm of soil over the roots to prevent them from drying out during the growing season.



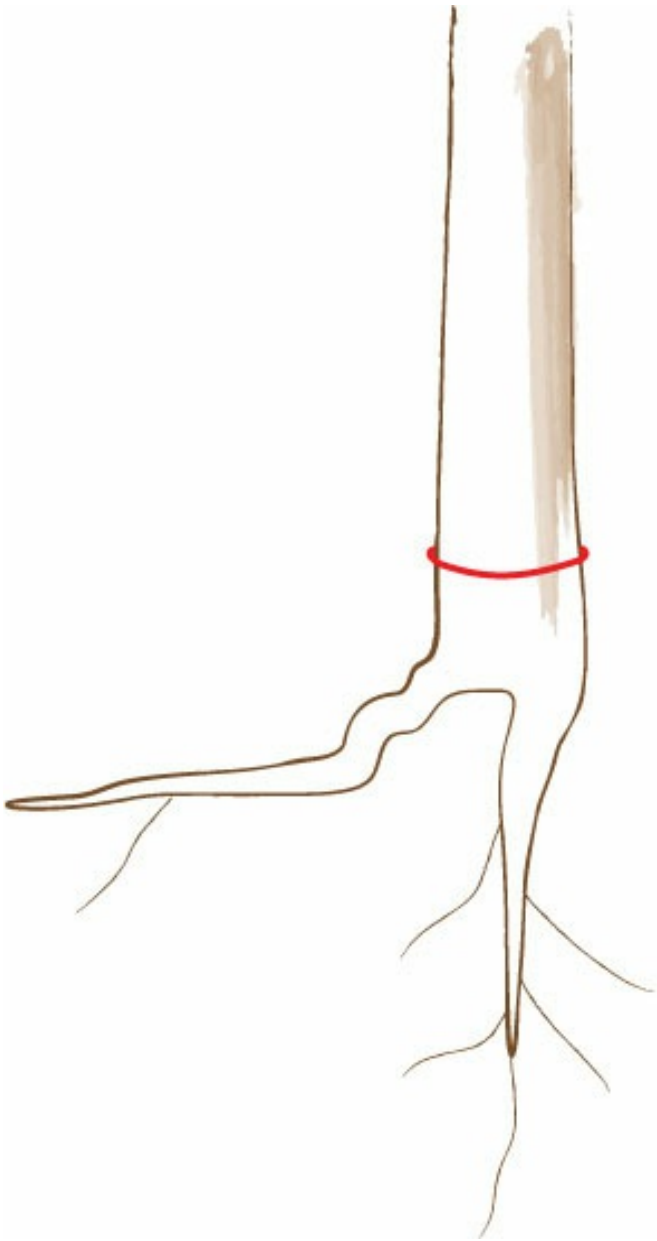
Over the course of the next few years, root growth will emerge from all areas of the rootball (including the downward growing roots that were pruned back) but the growth will be horizontal, and strongest and most vigorous from the lateral roots.

Saplings with poor or one-sided lateral roots must first be forced to produce a new set of roots by ground-layering them using a tourniquet, a thick piece of wire that is fastened securely around the base of the trunk where the new lateral roots are required.

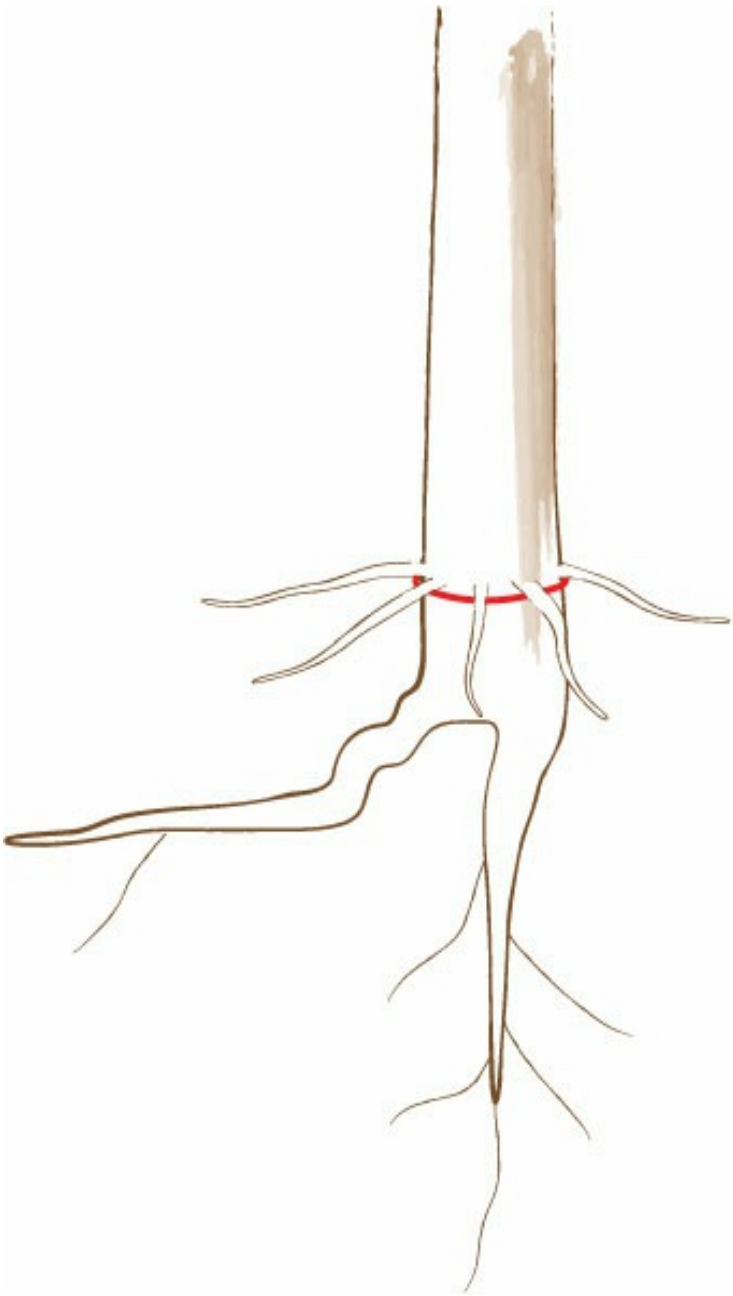
As the tree grows taller and bigger, its trunk swells and the tourniquet begins to bite into the trunk. This causes new roots to emerge in a circle above the tourniquet. In time these roots become thicker and strong and as they do, they become more able to support the tree themselves, making the old root system redundant. At this point in time, the old rootball can be removed.



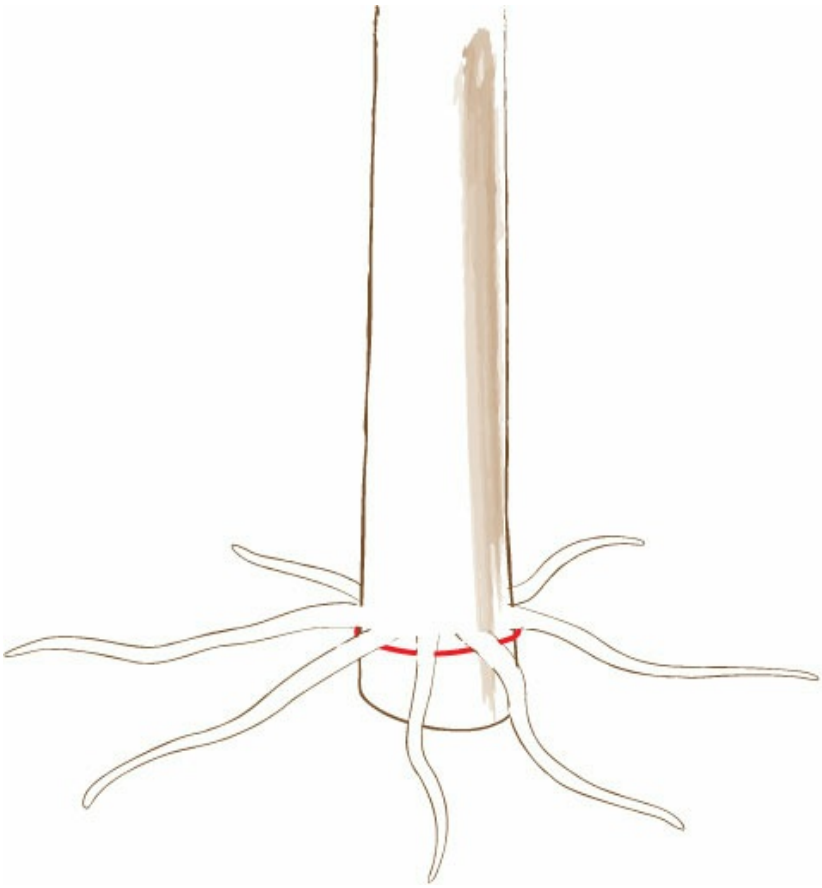
It is common for young seedlings and saplings to have poor or one-sided lateral roots. Simply planting such a tree with a root formation of this type into the ground or on top of a tile will do little to create new lateral roots, unless you are exceptionally lucky.



Before planting the tree into the ground for field-growing, a piece of heavy gauge wire is firmly secured around the base of the trunk. The wire should be firm against the trunk of the tree but there is no need for it to be so tight that it damages the bark.



As the trunk naturally swells due to new top growth (new shoots and branches), the wire tourniquet very slowly begins to bite into the trunk, prompting the tree to create a ring of new roots just above the tourniquet. How long this process takes is entirely dependent on how fast the above-ground parts of the tree are growing and can take 18 months to two years to work successfully. It is, however, a sure-fire method for creating good lateral roots.



Once the new lateral roots have thickened and become strong enough to support the tree by themselves, the whole of the old root system can be removed in early spring and if required, planted on top of a ceramic tile back into the ground or straight into a bonsai pot.

And so, in the spring of 2003, with space available in my front garden for the tree, I bare-rooted the Linden so I could study the rootball fully, removed downward growing roots as much as I was able without threatening the health of the tree itself, and planted it on top of a large ceramic tile in the ground.

March 2004: the Lime lifted from the ground 2 years later.

March 2004: Just a year later I lifted the tree from the ground to inspect the roots and prune them as necessary. With the Linden growing on top of a tile, digging the tree up was simply a case of digging a shallow trench around the base to sever the longest lateral roots and then to literally lift the tree out of the ground.

The image above shows the tree after I had washed off the garden soil so that the roots could be inspected and pruned as necessary.

Function of Roots

The root system of a bonsai is normally only considered at repotting time

and for the rest of the year it remains out of view and often out of mind. Its development though is as important to the health and growth of a bonsai as the rest of the plant.

The roots of any plant have three main purposes; the first is simply to anchor the plant into the ground or soil. This is performed by the thick, strong roots which radiate from the base of the trunk. The second purpose is to store nutrients during the dormant period (usually winter).

Lastly, roots function to absorb water and nutrients via single cell growth extensions, called root-hairs. Water is then supplied to other parts of the plant via the Stele.

Trees growing in dry soils or soils that, during periods of drought, develop a tap root that travels into the ground until a continual source of moisture is found, before developing fine roots that are able to 'gather' water and nutrients. Trees (for instance many coniferous species) growing in wetter soils, or trees that have a lower requirement of moisture, form a wide spreading fibrous root system in which there is no main or tap-roo

Roots grow through the hours of darkness, receiving energy that the plant has accumulated during daylight hours. In the daytime, root growth is very slow as the root-system supports growth in the above ground areas of the plant.

Root hairs and epidermal cells absorb water and nutrients from the soil, and these are transported up the trunk to the leaves of the plant. However, a great deal of water (around 95%) is given up to the air as a result of a process commonly known as transpiration.

To give an idea of how much water is required by a typical tree growing in a forest, it has been estimated that Eucalyptus regnans growing at around 250 feet in height can lose several hundred gallons of water on a hot day. If the tree is to survive, this water must be replaced by its network of fine roots that will typically equal the size of the foliage that they support.

The rise of water in a plant body is caused by root pressure, capillary action, transpiration and cohesion. A tree of 100ft (or more) is only able to supply water to its uppermost branches because the tensile strength of water is very great; that is to say, an enclosed column of water will not break into separate droplets except under enormous tension.

Roots absorb water by a process known as osmosis, whereby water with a low concentration of minerals and nutrients passes through the root membrane, the 'Endoderm', towards the moisture within the root system and the Stele which has a higher concentration of minerals and nutrients. It should be noted that if the water in the soil has a stronger solution of nutrients than the roots, usually as a result of overfeeding, water will be drawn from the roots back into the soil, depriving the tree of water. This process is known as reverse osmosis.

If the soil available to the roots of a plant is too dry, root hairs wither and are no longer able to absorb water and nutrients. Root hairs dry out rapidly when exposed to situations where there is no moisture and this is why allowing the soil in which your bonsai grows to dry out, for however short a period of time, is very damaging.

Conversely, within compacted or poor-draining soils, roots suffocate and lose their absorbing capacity. For roots to grow well they require abundant amounts of oxygen in the form of aqueous vapour. If the soil is compacted air is unable to penetrate the soil and the root system can suffocate, leading to a dieback of roots, decay and root-rot.

Many plants are unable to make use of nitrogen in the air directly but some bacteria, like mycorrhizae, make their way into the roots of living plants and fix nitrogen so that it is then made available to the plant.

Mycorrhizal bacteria develops naturally in the soils of trees and can commonly be seen in the soils around Pines. Some tree species such as Pine, Juniper, Larch and Oak are especially reliant on mycorrhizae and, for this reason, suffer very badly if bare-rooted or have a large percentage of their existing soil replaced at once.

In terms of the above-ground parts of the tree itself, my focus was to build a thick trunk that had 'slow' taper and movement (rather than a heavily-tapered trunk, seen more frequently in classical bonsai design). A bonsai with slow taper and movement is also known as a bonsai with a 'far view', imitating a tree seen on the horizon. This concept is investigated in detail later in this book. To enable a trunk of this type, the lower branches of this tree were allowed to grow unrestrained throughout the growing season to help thicken the base while the upper branches were kept relatively well-pruned to keep the upper section of the trunk comparatively thin

July 2005: Two growing seasons later, the Linden growing in my garden. Notice the long extension growth from the top of the tree where I am thickening the top of the trunk to create trunk-taper.

February 2006: The tree is lifted from the ground again and bare-rooted so that the roots can be worked on.

February 2006: As can be seen in the image above, after the tree had been lifted from the ground and simply hosed down to remove the ground soil, the rootball was amazingly shallow and had formed a large mat of lateral roots.

With the soil washed from the roots, the rootball was ready to be worked on. The roots were then pruned; thick roots were pruned harder than thin roots to encourage balanced development throughout the root-pad. Roots that did not grow outwards radially, or crossed other roots, were either pruned away or rearranged.

February 2006: Photographed from a different angle while combing out and arranging the roots.

With the root-work completed for another year, the trunk thickening well and a good, if unrefined root-pad developed, the Lime was planted into a large plastic nursery tub (on top of a ceramic tile) to continue more refined development of the above soil areas of the tree.

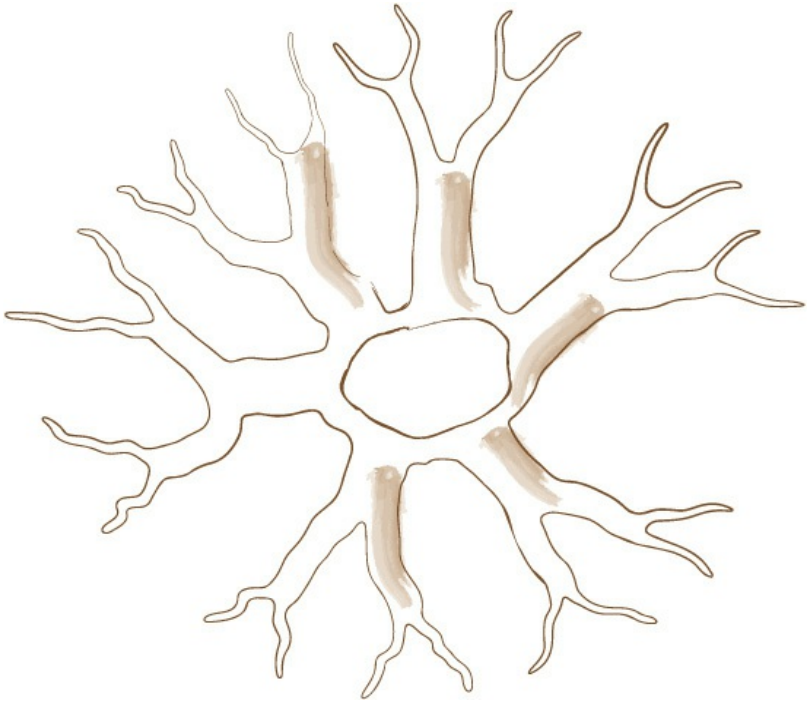


Diagram of the nebari, seen from above.

Seen from above (with the trunk in the centre) this is a very simplified and idealised image of how the roots of a formal or informal upright deciduous or broadleaf bonsai should appear. The roots spread radially outwards, tapering as they divide into smaller roots that then produce a heavily ramified root pad. As the roots then gradually swell over many years (decades) they become fused and form one large mass. However, this is an ideal that is difficult to fully recreate in reality and virtually impossible with some types of trees that do not readily fuse or self-graft.

July 2007: The Linden growing in a big black nursery pot with 2 low-growing sacrifice branches. Note that they are both staked upwards so that they are apically dominant. This causes the tree to encourage stronger growth in these two shoots than in other parts of the tree.

July 2007: The Linden had grown very vigorously for 18 months and development of the above ground part of the tree had therefore been rapid. As has been discussed already, I had no intention of developing heavy taper by trunk chopping and re-growing new sections of the trunk, however I did want to thicken up the lowest section of the trunk to gently increase taper.

In order to achieve this, in early 2007 I decided to use 'sacrificial growth'. All existing branches were heavily pruned back (to just one or two internodes each) during dormancy and this prompted new buds to emerge from all over the trunk in the following Spring, including two buds that

appeared near the base and that quickly extended into shoots.

For the whole of the 2007 growing season, I repeatedly pruned all of the branches on the tree except for these two low-growing shoots. This channelled the energy of the tree into them, causing them to grow exceptionally vigorously and both shoots reached over 2 metres in height in just a few months.

With this enormous amount of growth, the two sacrifice branches quickly thickened and in turn thickened the trunk downwards from where they joined it.

January 2008: After pruning back the tree during dormancy.

January 2008: Sacrifice branches are so-called because once they have achieved their goal of thickening a section of trunk, they are then removed, or 'sacrificed'.

However, I began to realise that these low growing branches could in fact become part of my final design for this bonsai. If the trees in the real world around me had powerful low-growing branches, why couldn't one of my

bonsai have them, if they improved its appearance?

So both sacrificial branches became part of the bonsai design itself, both being pruned back heavily to introduce branch taper and movement when the tree began to bud out the following spring.

September 2008: By the end of the growing season the two low-down sacrificial branches had been joined by a new shoot on the opposite side of the trunk. This had emerged from a bud that appeared earlier in the spring. As with the sacrifice branches, this new shoot had been allowed to extend unpruned to help it thicken up, however, unlike in the previous year, I had failed to keep the rest of the branch structure tightly pruned and as a result, this new low-down branch had grown very slowly in comparison.

September 2008: The two sacrificial branches had been joined by a new shoot on the opposite side of the trunk.

September 2008: The majority of the nebari was still covered by soil while root development continued.

September 2008: Roots that are exposed to the air will not emit new rootlets and new ramification will stop occurring in areas where the surface roots are exposed. For this reason the majority of the nebari was still covered by soil.

February 2010: The rootball of the Linden after bare-rooting.

February 2010: As the new buds of spring began to emerge on the branches in early 2010, it was time to remove the tree from its large black nursery-container and inspect and prune the roots as necessary. After 2 years without root-pruning and the roots buried out of sight under the soil, uprooting a bonsai to discover the extent of the previous year's root

development is always an exciting time!

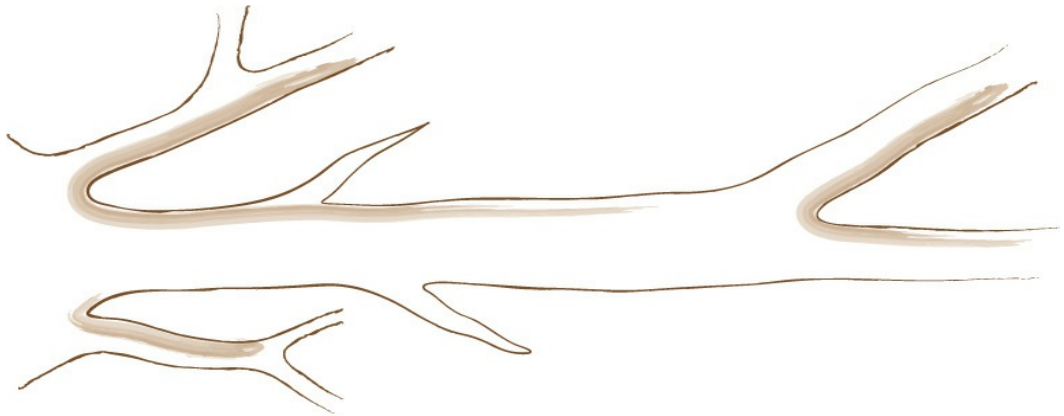
After thoroughly washing the roots with water, the tree was placed on the ground for inspection.

Washing the roots of many deciduous or broadleaf trees with water is not detrimental to their health if carried out at the end of the dormant period in early spring and it allows careful examination of the roots themselves. However, it must be emphasised that coniferous species such as Pine, Juniper and Spruce must never be bare-rooted as the washing away of the natural flora of the old soil will cause major stress to these trees. There are some deciduous trees such as Oak and Larch (officially classed as a conifer) that will similarly suffer.

February 2010: A long straight surface root lacking taper.

February 2010: The general appearance of the root pad was pleasing; it was suitably shallow with predominant lateral root growth and a mass of fine feeder roots surrounding the heavy surface roots. But, there were still several improvements that could be made.

The root circled in the image above had become very straight and lacked taper, particularly when compared to the other primary roots. As when pruning the branches of a bonsai for taper, a root is pruned back (if possible) to a secondary root emerging along its length.



A long straight surface root that lacks taper. A root such as this not only looks ugly but also leads to an imbalance in the root system of the tree as it will begin to dominate the roots around it. To make the thick root look more aesthetically pleasing and to balance the root system as a whole, it is pruned back harder than its neighbours, in much the same way that one balances the above-soil parts of a bonsai by pruning more vigorous branches harder than weaker branches.

Abnormally vigorous roots such as these often occur when a branch in the tree that it is supplying is allowed to become especially vigorous. It is more than feasible that this particular root has become excessively thick as a result of the sacrifice branches I had encouraged in the previous few years.

The long straight root is cut back to secondary/sub-roots as one does when pruning back branches for taper.

It is possible to cut back thick roots leaving a branch stub if there are no suitable secondary roots to prune to, however, the success of this depends on the tree species and how willing it is to produce new rootlets directly from an old surface root. Even generally more forgiving deciduous species, such as Beech/Fagus, will suffer dieback if thick roots are cut back, leaving just a large stub. So, unless you are certain of the species you are using, it is always better to err on the side of caution and cut back thick roots slowly.

When pruning heavy surface roots, make a sloping cut so that the wound faces upwards rather downwards into the soil.

February 2010: First the fine roots were trimmed.

February 2010: Before removal of the long straight root, I gave the fine feeder roots of the rootball as a whole a trim, by simply using a sharp pair of scissors to cut around the edge of the rootpad.

February 2010: After trimming all long roots growing from the base of

the rootball.

This was followed by a trimming of any long fine roots that were growing from the base of the rootpad. This reduces their vigour and ensures that the lateral roots in general continue to be encouraged to grow more strongly in comparison.

February 2010: Finally, the thick surface root is pruned back.

Finally the long straight surface root is pruned back using a sloping cut. Wound sealant can be used on the resulting wound but it is not necessary, particularly as the wound will be partially buried under the soil and as Linden callous extremely well, any risk of die-back is negligible.

February 2010: Further surface-root faults to be addressed in the future.

February 2010: Further surface-root faults remain but these will be addressed in the future. The lowest circled root is too thick and will be removed entirely. Pruning this root heavily will also slow the thickening of the primary root it is attached to.

To its right is a root that grows slightly upwards before plunging into the soil. This can be removed as there is a suitable root to replace it already. The uppermost circled root lacks taper and will be halved in length.

However, at this stage of development, the removal of a thick surface root often also means the removal of a large number of feeder roots so it becomes necessary to address the pruning of primary roots slowly in stages, over several years.

Detail-images of the thick surface root on the right of the Linden's nebari over a period of 2.5 years.

Studying the above montage of images taken over 2.5 years, the thick surface root on the right of the Linden's nebari can be seen to be too long and straight in September 2008. the middle image shows the root after it has been pruned (in February 2010) and finally, a year later in April 2011 after the wound has healed and the new secondary roots have begun to thicken, creating good root taper.

September 2011: Detail of the root 18 months after pruning.

September 2011: Detail of the root 18 months after pruning. The wound should have healed over and have disappeared within another 18 months.

September 2011: Leaping forward 18 months, the appearance of the root and the nebari in this area had greatly improved. A visible wound still remained where the root was pruned, however it had become significantly smaller already and will disappear as the Linden calluses over the remainder of the wound.

Example of Pruning Heavy Roots on a Field Maple

January 2005: This Field Maple has just been harvested from the ground after 5 years of field-growing; however the nebari is very poor and consists of just 3 thick roots, each with poor taper.

March 2007: 2 years later and significant progress has been made on the nebari of the Field Maple. The thick roots have been reduced back to thinner secondary roots and a number of new roots are being approach- and thread-grafted to the trunk-base. However, of the three original thick roots, the middle one has been difficult to reduce sufficiently in length, so I decided to split and hollow it.

March 2007: Using some branch-splitters to separate it lengthways into two halves, I split the root into two halves. Then, as the tree was unlikely to be able to callous over the wound for a great many years, if at all, I used a Dremel fitted with a small carving bit to hollow out the remaining exposed deadwood.

February 2010: Three years later while bare-rooting the tree in spring, the same thick root can be seen again. Here it is possible to see how the root was split lengthways into two sections 3 years previously and, since then, the resulting wounds have healed over.

September 2011: The same split Field Maple root 4.5 years after splitting and hollowing.

September 2011: As with Tilia/Linden, Field Maple (Acer campestre) callous well and the wound has healed over very well producing a pleasing tapering transition from the thick primary to the two thinner secondary roots.

March 2010: After Winter pruning and wiring.

March 2010: After repotting I carried out my annual pruning and wiring of the previous growing season's new growth and adjusted older growth as necessary. My main aim at this point was to create taper and movement in the branches, removing or wiring any long straight sections of wood in anticipation of the new buds that would appear in spring, and the coming-season's growth.

Note that, after wiring, each and every shoot of the tree has been placed so that it grows upwards or outwards, grows into its own space in the canopy and does not cross any other branch.

With relatively mild Winter temperatures here in the UK (temperatures very rarely drop below -7°C to -10°C), I am able to work on most fully hardy deciduous species throughout the Winter without any problems unless the tree or its soil are actually frozen. However, care must be taken in colder climates to carry out such work as the leaves are falling in Autumn while there are 3-4 weeks before the tree becomes entirely dormant, or in Spring as temperatures begin to warm again and the tree comes out of dormancy.

With Tilia/Linden it is also necessary to be merciless with any branches that have become too thick (particularly in the upper third of the tree) or have long internodes and these must be continually removed. However, if the

complete removal of a branch will leave a blank area in the branch structure, a stub (containing no nodes) can be left and this will result in new buds appearing from the base of the old branch, even when removing primaries.

A branch growing from the trunk, which has become too thick. If there are no nearby branches to replace the hole in the foliage mass that removal will create, the branch can be reduced to a stub.

The branch is removed leaving a short 1”-2” (2.5cm-5cm) stub with no remaining nodes (the joint where one would expect new buds and leaves to emerge).

When the tree tries to put out new growth on the newly removed branch but no nodes remain, it produces new buds directly from the trunk around the base of the stub.

These new buds extend into shoots; once the wood of these new shoots has hardened off.....

.....the old branch stub can be removed and the new number of new shoots reduced to no more than two.

New leaves unfurling on a Linden: to stop a new shoot extending further and to stop the possibility of the growth having long internodes, the central stem of the shoot is pinched away leaving behind 2-5 leaves depending on its position on the tree. New shoots in the upper third of the tree should retain just 2 leaves, whereas new shoots in the lower third of the foliage mass can be allowed to keep 4 or 5. This balances the natural apical tendency for the tree to be stronger in the upper areas and weaker in the lower parts of the foliage mass.

November 2010: By the end of the growing season the ramification of the branches has greatly increased.

November 2010: With the trunk and primary branches now well established, the growing season of 2010 was spent building up the number of secondary and tertiary branches on the tree to increase ramification of the foliage mass.

Rather than allowing certain shoots to extend as far as possible to thicken the trunk or a primary branch, new growth was continually pinched and pruned back. New shoots in the apical areas of the tree (in the upper third of the canopy) were allowed to open out to just 2 leaves before being pinched back to stop any further extension. To balance the natural apical tendency of the tree, new shoots on the lowest branches were allowed to extend further, to 4 or 5 new leaves, before then being pruned back to just 2 or 3 new leaves.

During that winter, the appearance of the Linden gave me great pleasure and I decided that, after a decade of development, it was time for the tree to receive its first bonsai pot!

Repotting **March 2011:** As the new spring buds extended, and were about to unfurl, I decided to repot the Linden. The tree was lifted out of its black nursery container and placed on a table to be worked on.

Using a chopstick (any similar sized piece of wood is ideal) I gently combed out the roots around the edges of the rootball as well as removing the old surface soil. As this tree has been bare-rooted in the past, it contains no ground-soil or little organic matter that will have broken down and, has had its surface roots meticulously arranged over the years, it was unnecessary for me to be very aggressive with the rootball as a whole.

In the last image on the previous page, it is possible to see how strongly the bottom roots have grown and these will need to be pruned back hard.

As the majority of the rootball consists of a very fine mass of densely packed roots resulting from years of root-pruning, it was also unnecessary for me to be wary of cutting through any thick roots (each one potentially carrying a high percentage of the root mass as a whole) within the lower levels of the soil. Using a pair of very sharp scissors I was able to simply cut straight across the bottom of the rootball, removing all of the loosened fine roots.

A well developed bonsai rootball can be considered to be a below-ground mirror image of the tree itself; that is the lower roots that grow from under the root-mass will be the most vigorous area of roots and these need to be pruned harder than the weaker but more desirable surface roots.

Pruning the bottom roots harder will also balance the energy of the above-soil parts of the tree and does have an effect on reversing the apical tendency of the bonsai.

After pruning the bottom of the rootball, to leave a shallow pad of roots.

With the base of the rootball pruned, the tree is offered up against its new bonsai pot, an oval from Erin Bonsai. As can be seen, the width of the rootball now needed to be pruned to allow the tree to be potted up.

The Linden is placed on top of the upturned bonsai pot.....

.....and the edge of the rootpad is trimmed with some sharp scissors.

With the rootball pruned, it was time to place the tree into its pot, wire and water it in!

April 2011: A week after repotting.

April 2011: Just a week after repotting, the Linden had sprung into life, opening out dozens of bright-green leaves. Moss was placed on top of the soil

surface and the tree photographed in all of its glory. Seeing a tree finally reach a bonsai pot and create an image such as this after 10 years of development is hugely satisfying.

April 2011: The Linden/Tilia cordata seen from above.

April 2011: The trunk-base and nebari seen from above.

April 2011: The trunk-base and nebari.

May 2011: Defoliating the Linden to reduce leaf-size.

May 2011: Within 6 weeks of the tree coming into leaf, I defoliated the Linden, using scissors to remove each leaf while leaving the petiole (leaf stalk). As already mentioned, leaf-size on this species is naturally quite large and this technique helps to produce a crop of smaller leaves. Defoliating or leaf-cutting as it is also known, involves removing the leaves of a bonsai

during the summer. This forces it to produce a replacement set of leaves in a second ‘false’ Spring flush of growth. This second flush of growth results in increased branch ramification and leaf density, as well as a reduction in leaf size. The technique of defoliation will be discussed in more detail later in this book.

With the branches bare it was also an ideal time to wire new shoots that had emerged as well as to remove wire that was beginning to bite; branches of deciduous trees that are wired in autumn tend to have set after the spring flush of growth and require removal of the wire.

Note that carrying out root-pruning and defoliation on the same tree within a few weeks of each other can severely weaken many deciduous bonsai. Care must be taken that the tree in question is vigorous enough to cope with such harsh treatment.

After defoliating all but a few very small leaves, I fed the tree well and ensured it received maximum sunlight in order to provide ideal conditions for the Linden to leaf-out as strongly as possible.

May 2011: The Linden after defoliating.

August 2011: The Linden was back in leaf within 4 weeks and was then allowed to rest for the remainder of the growing season.

August 2011: Tilia cordata/Small-leaved Linden or Lime. Height 22”/56cm. Planted in a bonsai pot handmade by Erin Bonsai.

Species Guide

Tilia cordata/Small-Leaved Lime or Linden

BONSAI CULTIVATION NOTES

POSITION

Full sun or partial shade. Protect from winter temperatures below -10°C.

FEEDING

Every two weeks during the growing season. Tilia prefer a very slightly acidic soil and on a long-term basis will begin to suffer from the effects of lime in hard water, unless given an occasional dose of ericaceous fertiliser.

REPOTTING

Every one to two years in spring as buds extend, using a basic soil mix.

PRUNING

Hard prune during late winter or early spring. During the growing season trim back to shape continually. Shoots can re-grow within 3 or 4 weeks of each pruning. With sufficient feeding, branches can be re-grown 3-5 times in a year. Stop pruning at the end of August to allow new shoots enough time to harden up for winter. Leaf-cutting can be carried out on developed bonsai in May or June, which will improve branch ramification and reduce leaf-size.

WIRING

Wiring can be carried out at anytime of the growing season or in dormancy. The bark is very sensitive and marks easily. However, slight wire marks will disappear quickly. Limes heal remarkably quickly after trunk chopping or branch removal. Heavy pruning scars made during the growing season can lead to unsightly bulges from excessive scar tissue production; this can be pared down using a sharp knife as necessary.

PROPAGATION

Stratify seed for 3-5 months and sow outside in spring, or sow outside as soon as ripe in autumn. Ripewood cuttings in late-summer.

PESTS AND DISEASES

Susceptible to root-rot, gall mites on leaves, scale insects and aphids.

STYLING

Suitable for all forms except Literati, though the Informal Broom form best reflects the tree’s natural habit. Suitable for larger-sized bonsai.

Spring 2011: Help with photographing the Linden for this book .....from the cat!

Using Material From the Garden for Bonsai

A great source of material for bonsai are shrubs and trees found growing in gardens, either as part of the garden itself or hedges planted on the boundary.

Due to their ‘domestic’ use, garden material will have often been repeatedly pruned back over the years creating a more compact growth habit. For instance, the subject of the first Progression Series is a Privet that despite being over 80 years old had only been allowed to reach a height of around 2 metres rather than the 4+ metres of a Privet found growing in the wild.

Garden material is often relatively easy to dig up from the ground and has a high survival rate as the well cultivated and watered soils in our gardens have a tendency to create compact rootballs.

Care must still be taken to dig up and harvest garden material only at the appropriate time of year (normally during dormancy, and preferably in early spring before the new leaves appear) to ensure its survival.

Chapter 2

Larix decidua/European Larch

Larix decidua/European Larch

Progression Series

Larix or Larch for Bonsai

Larix is a genus of just 10 species of deciduous, coniferous trees native to the coniferous forests of the Northern hemisphere. They are a very popular species for bonsai as, unlike other conifers, Larch will continue to grow from May each year all the way through to September, making development relatively quick. Raw material is relatively easy to obtain, either from purposely trained field-grown bonsai material or from the wild. As bonsai, Larch are easy to care for, very tolerant of severe pruning, wiring and styling.

Larch radically alter in appearance over the course of a year as the seasons change. Growth in spring normally commences with the appearance of small whorls of bright green leaves that resemble tiny green shaving brushes on the bare branches. During the summer, the brilliant green needle-shaped foliage is borne in loose spirals on long shoots and in whorls on shorter flowering shoots or spurs. This is followed by brilliant autumnal colours of bright yellows. Small cones that appear in spring on mature bonsai are usually purple in colour before browning and persisting on the tree for a number of years before dropping.

There are 4 Larix species that are commonly seen as bonsai, all with very similar growth habits, care and styling requirements.

Larix decidua/European Larch

In its native central and southern Europe, Larix decidua grows extremely fast in its early years, eventually reaching heights of 50 metres or more, at which time it loses its narrow growth habit and becomes a broader tree with a flattened crown, with branches gracefully drooping. Its leaves are 1-3 cm long, flat, soft and pale green turning to golden yellow in autumn. It has greyish bark that forms cracks and ridges in older specimens.

Larix kaempferi/Japanese Larch

Though native to Japan, Larix Kaempferi is also widely planted in other parts of the world as a forestry tree due to its strength and vigour. Its growth as a juvenile tree is even faster than the European Larch though its ultimate height is no greater. Unlike the drooping branches of the European Larch, the branches of Larix kaempferi spread more or less horizontally. The main way to differentiate between the two species is the colour of the new twigs in winter; Larix kaempferi has a reddish colour whilst Larix decidua is yellow.

Larix x eurolepsis syn L. marschlinsii/Dunkeld Larch

A hybrid of L. decidua and L. kaempferi, the Dunkeld Larch displays characteristics of both its parents.

Larix laricina/Tamarack (American or Eastern Larch)

Very hardy, to around USDA Zone 3. Although I am not familiar with this particular Larch species, I am assured that it is regarded in the US as being superior to other Larch species.

The Larch featured in this Chapter's progression series were all obtained in early March 2010 as newly-harvested field-grown material that had been developed specifically for bonsai.

March 2010: Field-grown Larch at the annual Bonsai Car Boot Sale at Edgbaston Botanical Gardens in Birmingham, UK.

The Bonsai Car Boot Sale at Edgbaston Botanical Gardens in Birmingham, (UK) is an annual event taking place in early spring each year and offers the opportunity for UK enthusiasts to buy, sell and trade bonsai, potential bonsai and raw material. My visit in 2010 culminated with the purchase of 3 European Larch that had been grown in a field in nearby Coventry for 10 years, harvested at 4am that morning and sold to me just 5 hours later!

March 2010: Within a few hours, the Larch had travelled 100 miles down the road to London where I was able to study them more closely. The advantages of good quality material that has been specifically developed for bonsai over ordinary garden centre or tree-nursery material are numerous.

Well developed field-grown trees will already have a compact rootball with a workable nebari and surface roots having been root-pruned in previous years. They should already have something of a tapering trunk with

movement and numerous low-down branches so a branch structure can be chosen immediately, if desired.

March 2010: my newly purchased field-grown Larch.

March 2010: The first Larch Progression Series of this Chapter features one of these three trees. With a trunk that had some gradual movement from side to side along its length, it lent itself immediately to an informal upright form. The trunk had good flare at its base and there were a couple of options as to which direction the trunkline would eventually follow.

With the tree back in my garden it was time to work. The Larch was covered in buds that had already turned a gold colour from their dull brown of winter (an indication that a Larch is coming out of dormancy). Before the tree put any more energy into pushing out these buds into growth, that might then be wasted by pruning, I wanted to hard prune the tree immediately so its energy would be concentrated on developing my intended design.

March 2010: The first Larch Progression Series of this Chapter features a tree that had a trunk that lent itself immediately to an informal upright form.

Finding a design within an unruly mass of branches and shoots, such as those that faced me with this tree, can be very difficult as there are so many variables and choices as to potential trunklines and potential branches to keep or remove. However, by approaching a tree methodically, as I will now describe, reaching a successful design can be greatly simplified.

Firstly, the trunk height needed to be established. As has been already covered within this book, the ultimate height of the tree as a bonsai is decided by its trunk diameter. With a 3”/7.5cm diameter trunk base, the trunk needed to be approximately 18”/45cm in height and no more than 30”/75cm (if I were to develop it as a slender literati-form bonsai).

Having reduced the height of the trunk to 18”/45cm, I then reduced the length of all of the potential branches. The total width of the tree as a bonsai would not be more than 2/3 of its height and so all branches could be safely reduced to a generous 12”/30cm without any danger of removing growth that I would later regret.

With this straightforward reduction in size and density of the trunk and branches by removing all growth that could never be part of a successful bonsai design, it was considerably easier to contemplate potential designs for the tree.

March 2010: The Informal Upright Larch repotted and hard pruned.

The Larch had been dug from the ground that morning and the rootball wrapped in wet sackcloth to stop the roots from drying out. As it was still encased in the sticky clay ground-soil in which it had been growing in the ground, before potting the tree up, I would need to remove a large proportion of the ground-soil as it would be totally unsuitable for pot-cultivation. Using a wooden chopstick I started to carefully pull away the excess soil around the roots.

To my great pleasure, as the ground-soil fell away, revealing the extent of the nebari, trunk base and root system itself, I was able to see that the rootball was extremely compact and contained many fine feeder-roots. This is something one can expect to see with well-developed field-grown material

for bonsai that you rarely find with landscape trees purchased from garden centres and tree-nurseries.

I continued to remove the majority (but not all) of the ground-soil and then potted the tree into a 10” wide plastic training pot. Note that, unlike with ordinary deciduous trees, I did not wash or bare-root the rootball. Larch can withstand bare-rooting on occasions but I would not recommend it as it is hugely stressful for them and can lead to failure of the tree.

Repotting Larch

Larch dislike interference with their roots and extra care must be taken when repotting. The timing of Larch repotting is also vital and ideally should be carried out in very early spring (around February in the UK) as the brown buds of the winter begin to turn a gold colour. It is often said that Larch should be repotted before they ‘show green’; that is, before the golden buds begin to open revealing the green of the tightly furled needles inside. The more green that is showing, the more dangerous repotting becomes and the gentler any root pruning or disturbance should be.

Famously, the roots of Larch during dormancy can be deceiving as they will often appear to be rotten; however inside the mushy exterior of the root there is a fine white filament which is the healthy root. As the buds turn golden and the Larch comes out of dormancy, the roots become turgid again producing healthy-looking white fleshy tips.

Unlike deciduous species and akin to Coniferous trees, as they are officially classed, Larch react badly to heavy root-pruning and dislike being bare-rooted. Larch have a strong symbiotic relationship with mycorrhizal fungi occurring in the soil. The fungi form a sheath-like structure on the root-tips of the tree through which nutrients are passed from the soil to the tree itself (mycorrhizae can sometimes be seen in the soil at repotting time as a cotton-wool like fungi). Bare-rooting a Larch (or coniferous species in general) removes these beneficial fungi within the old soil to a degree that causes great stress to the tree itself.

May 2010: Less than two months later, new shoots began to extend, indicating that the tree was recovering well.

May 2010: Within a couple of months of repotting and heavily pruning the Larch, it was extending new shoots. As with all tree species, the appearance of new buds and then leaves is not indicative of a tree that has recovered from stressful work, particularly on the roots. (Even heavy branches or trunks with no root-system that have been thrown onto a compost-heap in late-Winter can often issue new buds or even leaves simply from the resources held within the trunk itself.) However, the extension of new shoots is a sure sign that a tree is issuing new roots under the surface of the soil and is recovering.

For the next month the tree grew very strongly and I was able to start

pruning back the new shoots once they had reached 15cm or more to encourage back-budding and ramification within the branch structure.

Such was the strength and vitality of the Larch that by July I decided to style the tree for the first time. Having already chosen the primary branches in March, styling simply required wiring of each and every branch and repositioning it.

Wiring a Larch in full-leaf is not an easy task as the foliage can become very densely packed and is easily caught in the training wire as it is coiled around the branches. However, Larch respond very well to partial defoliation and once carried out it enables relatively clear access to the branches for wiring.

Defoliation or Leaf-Cutting

Defoliating or leaf-cutting is a technique that involves removing the leaves of deciduous and broadleaf bonsai during the summer; it forces the bonsai to produce a replacement set of leaves in a second 'false' spring flush of growth. This replacement set of leaves results in increased ramification and leaf density, a reduction in leaf size and internode length and finally, superior Autumn colours.

A Warning About Defoliation

Many enthusiasts first try defoliating on trees that are not horticulturally and/or aesthetically ready for defoliation.

Before describing defoliating techniques in detail, it is worth highlighting the need for trees to be healthy and vigorous before carrying-out leaf-cutting techniques. The removal of the leaves from a tree is debilitating and will temporarily weaken any bonsai; defoliating should only ever be carried out on vigorous specimens. Trees that are showing signs of weak growth, whether it be due to recent repotting, disease, styling or a recent trunk chop, are not suitable for defoliating.

Be aware that defoliating can be so taxing on a bonsai that failure to respond can occur if the tree is not vigorous; parts of the branch system can be weakened to the point that they die-back.

Defoliating is also a technique normally intended for 'finished' bonsai only; a tree intended for defoliation will have the trunk, primary, secondary and tertiary branches established. Defoliating a tree that requires branch or

trunk building will slow down development of these parts greatly.

Different tree species react in a variety of ways to defoliating; some respond quickly and strongly to total defoliation (to the extent that they can be defoliated more than once a year) while with other species it is preferable to only partially defoliate.

Total Defoliation

The most common way to defoliate a tree is to remove each and every leaf with scissors, leaving the leaf-stalk or petiole behind. The remaining petioles nourish the tree as new buds contained within the leaf-axils begin to extend and open out. As the new leaves start to open out, the petioles dry out and fall away from the branches.

After defoliating a tree, leave it in good light to stimulate stronger budding, particularly from inner and lower branches. Without leaves, a defoliated bonsai will require less watering.

The new leaves start to emerge 3-6 weeks after defoliation (depending on the exact timing, tree vigour and tree species) and are smaller and more numerous. Vigorous trees will also back bud as a result of defoliation.

The exact timing of defoliation differs from one tree species to another. As a very general guideline, leaf-cutting can be carried out after the spring flush of growth has hardened off (the leaves lose their spring colour and become more 'leathery'). For more detailed timing notes please see the specific species guide later in this article.

Immediately after total defoliation, the tree is bare for the first time since spring and it is possible to study the branch structure; this is an ideal time to prune, wire and style a deciduous tree.

Partial Defoliation

Partially defoliating a bonsai is much kinder and with some tree species is preferred to total defoliation. Large leaves (or the largest leaves) are gradually removed through the growing season until late summer. These large leaves are slowly replaced by smaller leaves as and when required.

There are several advantages to partial defoliation. The stress of leaf removal is spread over a number of weeks or months. The largest leaves tend to be in the strongest, most apical areas of the tree (that is, the tips of the branches, particularly in the crown or apex) and their removal enables light to

reach the weak, inner and lower branching. In this way, partial defoliation can be used as a means to reinvigorating the weaker, lower areas of a tree by weakening the apical areas.

Larix species or Larch can be partially defoliated to allow ‘cleaner’ branches for easier mid-season wiring and styling. Typically new shoots will emerge from the base of many of the leaves that are removed, greatly increasing ramification.

If this technique is carried out in July-August and the tree is vigorous, a second crop of new shoots (branches) can have emerged and require wiring within 4-6 weeks, greatly increasing ramification and taper of the branches.

For a healthy and vigorous Larch that is still in its juvenile stage and pushing new vegetative growth hard, it is possible to partially defoliate twice in one season, producing 3 strong flushes of back budding and new growth from Spring until Autumn.

In the centre of the image above is a new shoot that has appeared during the current growing season; around its base is a rosette of leaves. These make wiring of the new shoot and the branch from which it emerges difficult.

As can be seen on next image, the rosette of leaves around the base of the new shoot is simply plucked away. Note that, if you attempt to do this before the new shoot has hardened off sufficiently, the entire shoot can come away

with the leaves at its base. New shoots have normally hardened off enough to remain attached by early July, however, if they start to come away with the basal leaves, wait a few weeks before trying to defoliate.

The basal leaves removed. The new leaves along the shoot itself can then also be removed as long as 4 or 5 leaves or an emerging shoot are left intact.

A heavily congested Larch branch. Not only would it be impossible to wire but the appearance of the foliage is messy and unrefined.

The image on the next page shows the Larch branch and sub-branches after partial defoliation. The branches are now clean enough for wiring and styling.

Firstly, all downward growing shoots and leaves have been removed. Removal of this growth cleans up the foliage mass and allows the primary branch to be glimpsed through the foliage. Removal of downward-growing shoots that are very unlikely to be required as part of the branch structure also redirects energy within the tree itself back towards new shoots that are required for branch development.

As already described, basal leaves growing at the base of new shoots are then removed. Finally, individual leaves along the length of both new and old shoots are plucked away. If an emerging shoot does not already exist at the tip of the shoot, 4-5 leaves are left in place.

A new shoot that appeared in the current growing season, and has now hardened off. The shoot requires pruning but it also needs to be wired so that it can be repositioned and movement added as it is unnaturally straight at present.

The shoot is shortened back to the required length. All downward facing leaves are removed and the total number of leaves at the end of the branch is reduced to approximately 5. Notice the tiny buds along the shoot from where new shoots or sub-branches will now be prompted to emerge.

Wire can then be coiled around the shoot.....

.....and movement added to the shoot.

Indicated in red are the possible positions of new shoots (one can never be certain exactly where or how many new shoots will emerge).

New shoots that then appear can also be wired, greatly increasing ramification in a short amount of time.

July 2010: the Larch was partially defoliated then 100% wired for the first time. As the Larch is primarily a deciduous tree that can be enjoyed leafless through the winter, the branch structure is developed as one would for a deciduous tree rather than a conifer. This requires that the branches are not only well-ramified but also have good taper.

Larch branches are very easy to shape when wiring as even thick branches remain flexible. However, older branches do have a habit of springing back into position when the wire is removed.

I try to leave the wire on for as long as possible as slight wire marks made on the thick cambium of a Larch branch soon disappear.

July 2010: After defoliating and wiring the Larch for the first time.

August 2010: Just 4 weeks later and not only had new shoots emerged after the previous month’s defoliation but this new growth in turn had also been (lightly) plucked and wired.

August 2010: Just 4 weeks later and not only had new shoots emerged after the previous month's defoliation but this new growth in turn had also been (lightly) plucked and wired. Larch are a very fast growing species as one can probably imagine from these images!

Types of Larch Growth

As with many tree species, Larch have two distinct types of growth; juvenile and mature. Juvenile growth within a Larch can be seen by the emergence of many new extending shoots (as displayed by the Larch in this Chapter).

Mature growth in a Larch can be observed by the appearance of tiny rosettes of new leaves in spring that do not then extend into shoots as the season progresses. These non-extending buds are known as flowering spurs and are where the tree may flower in the future.

While a Larch bonsai covered in mature growth (flowering spurs) and cones is ultimately desirable when the structure of the tree has been fully developed, it can create major problems for the development of a tree into a bonsai. Flowering spurs will only very reluctantly revert back to juvenile growth and a branch that carries just mature growth can remain in stasis for many years with its owner unable to grow new shoots and branching from it.

A spent male flower on a Larch in summer.....

.....and a seed-cone that has emerged from a nearby female flower.

Flowering spurs and mature growth on a Larch occur where the tree does not want to extend new growth; typically this will be on lower and inner branches as well as on buds closest to the trunk. Because of the natural apical tendency of Larch (as with most other tree species), the juvenile and therefore vegetative growth will be predominantly at the tips of the branches, particularly those near the top of the tree. It is therefore important, when styling an old Larch for the first time, to be very wary of pruning an old branch back leaving just flowering spurs that will not respond with extending vegetative growth.

One should also be wary of accidentally dislodging flowering spurs whilst working on such a tree as they will not reappear in the future.

An Old Pot Bound Larch

Flowering spurs on a Larch will appear primarily in non-apical areas and at maturity in the tree itself. Maturity is prompted by a combination of factors

including age, stress, a lack of root space which increasingly reduces new vegetative growth as the years pass and, finally, a lack of pruning of the apical areas of the tree which severely weakens the non-apical areas on the lower and inner branches.

A very old Larch photographed in July at a time during the growing season when one would expect some juvenile extension growth. However, this tree is simply covered in flowering spurs.

I met this amazing tree during the summer of 2010. Its owner had collected it in 1975 from Loch Ness in Scotland where it had been growing in a small pocket of leaf-litter in a rock-crevice. As such, even then it was a small tree that had barely enough soil to survive, let alone grow vigorously.

The Larch had been taken home and planted in a small bonsai pot and over the next 35 years had barely been repotted (if at all) and was still growing in the same soil it had emerged from as a seedling in the wild, decades before. The Larch had received little pruning or styling. However, as the tree had become severely root-bound, all juvenile vegetative growth had ceased and instead it simply issued a new rosette of leaves from its flowering spurs each spring.

While this is by no means the kind of treatment one should give their

bonsai (and it still amazes me that the owner had managed to keep the tree alive for so long in these conditions), it does provide a wonderful example of a tree that has literally clung on to domestic life for three and a half decades!

Close-up of the flowering spurs of the Larch.

In the image above, taken in mid-July, it is possible to see the flowering spurs of a mature Larch in detail. These spurs are relatively long for a Larch bonsai. It is possible to age a flowering spur simply by counting the tiny rings or ridges running around it; each year a tiny ring of wood is laid down on the tip of the spur and the spur extends in length, by around a millimetre every 2-3 years.

A mature Larch can be encouraged to begin to 'grow' and put out some vegetative growth in a number of ways, principally by allowing the roots new soil to grow into (by either transplanting the tree to a bigger container or by root pruning) and by pruning the top growth. However, it is not possible to tell where new shoots will emerge from when they eventually do and it is likely that a large number of the mature branches will have simply continued

to emit just flowering spurs.

The trunk of the Larch was also an amazing sight with wonderfully old and scaly bark.

November 2010: The Larch showing autumn colours.

November 2010: By the end of November the leaves of the Larch had turned a beautiful golden-yellow, creating a stunning display.

November 2010: Looking up into the apex of the Larch.

Well-developed field-grown Larch will frequently have a multitude of branches to choose from when you style them. The great advantage of this is that it is possible to choose the ideal front of the tree according to the trunkline and trunk-base as well as the nebari. The many available branches ensures it is not necessary to take into account where the existing branches emerge from and any branches not required can simply be removed.

November 2010: The branch structure seen from above.

However, unlike broad-leafed, deciduous trees, Larch branches should not be removed entirely at their base (using concave cutters) as the resulting wound on the trunk will be visible for many years. Larch heal very quickly, in fact they callous so well that the wounds will tend to produce a swelling on the trunk. It is far more preferable as well as realistic to jin the branch, emulating the natural appearance of dead branches on Larch in the wild.

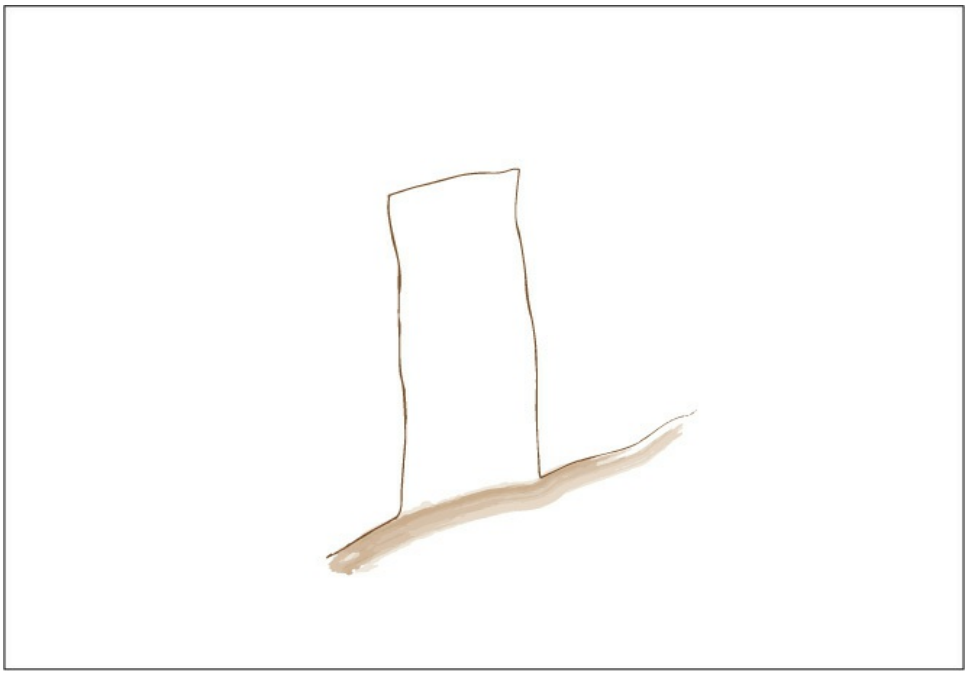
When removing an unwanted branch on a Larch, remove the bark using an ordinary knife or draw-knife and then break it along its length to replicate the effect of an old damaged branch in nature.

Large jinned-branch on the Larch.

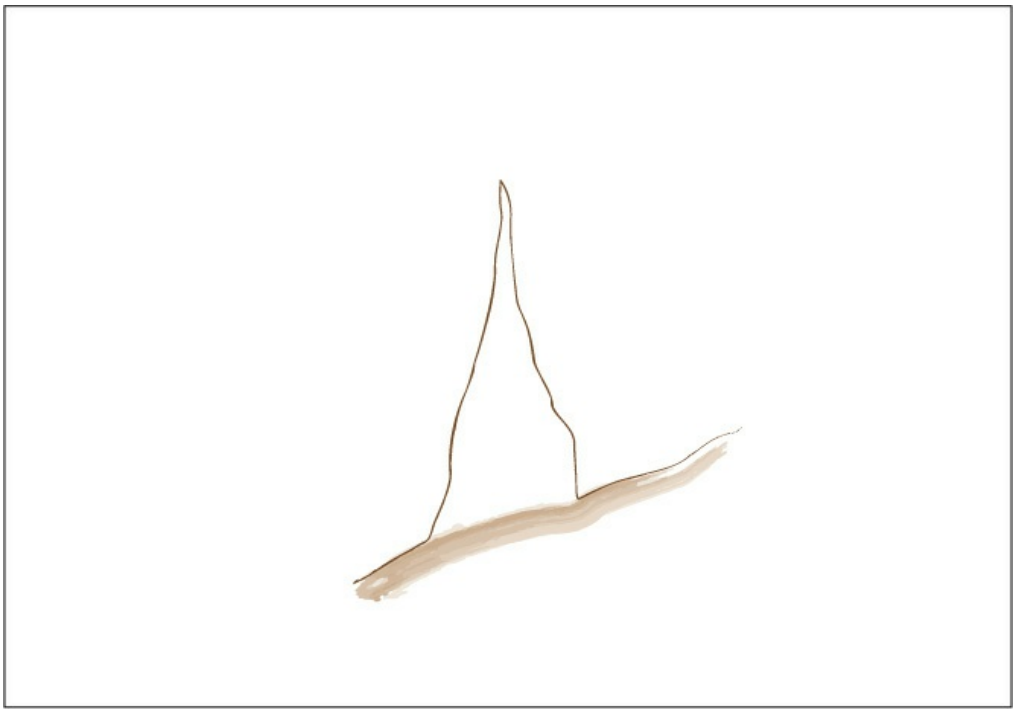
When the large jin on the Larch is seen from the opposite side of the tree, it is possible to see that it was created by breaking the end of the thick branch (once the bark had been removed) and the slivers of wood at its tip had been peeled downwards towards the trunk. The wound at the base of the jin has healed very rapidly in just a year.

A close up of the same jin during the summer.

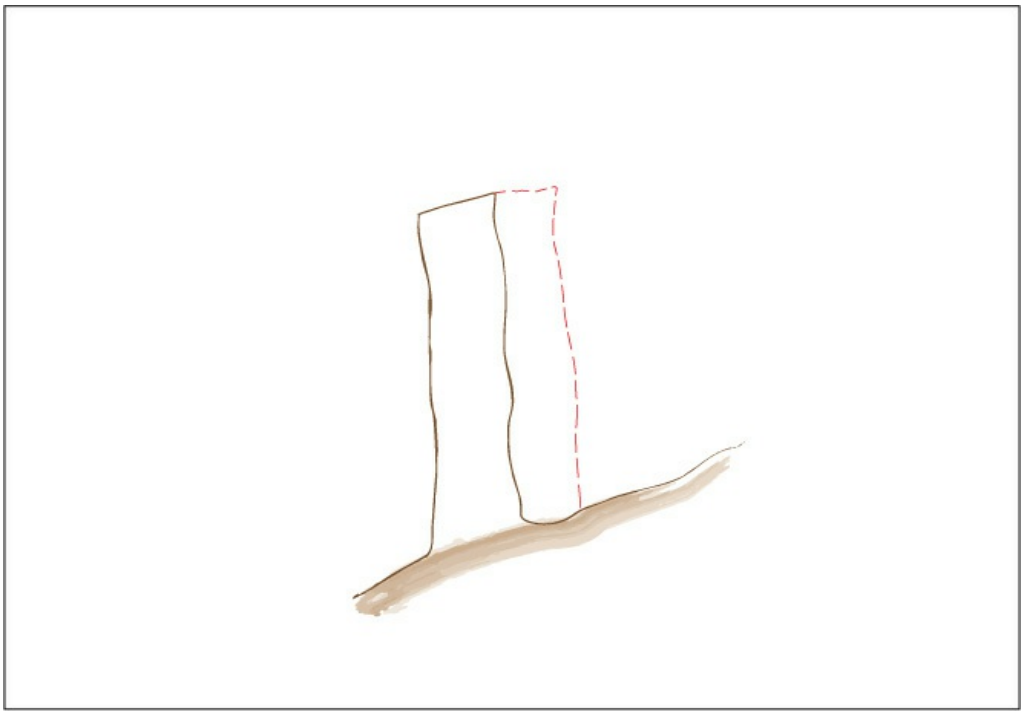
It is possible to see that I have also ‘thinned’ the jin at its base rather than creating a ‘parrots beak’.



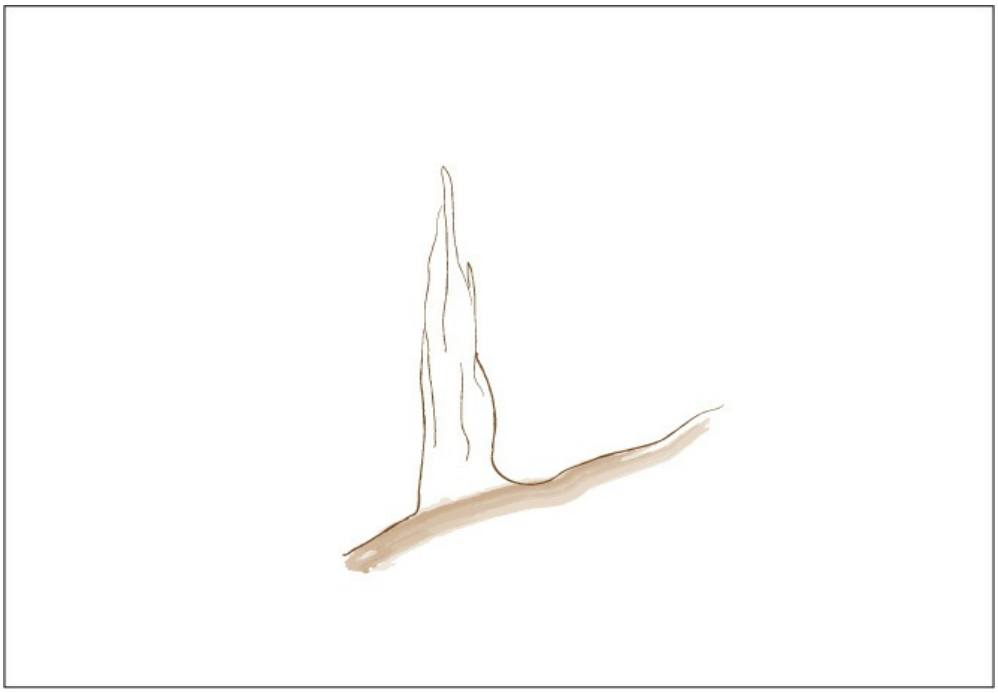
A thick branch that requires jinning. It has been pruned back and stripped of bark.



One major mistake I often see are jin that are shaped like ‘parrot’s beaks’, a derogatory term in bonsai describing a short fat jin that rapidly tapers to a point.



It is better to thin the wood down first, leaving a small indented hollow in the trunk at the base of the jin.



Before peeling back the wood and creating a more slender effect.

(An in-depth study into jin creating and coniferous deadwood follows later in this book)

This large wound on a Larch bonsai illustrates how not to remove a large branch (and why) on any Coniferous trees. The branch has been removed entirely and a slight indentation created on the trunk itself as one would with a deciduous tree. To make matters worse, the wound was covered with wound-sealant which has now formed into an ugly grey, sappy mess.

On the other hand, this branch (on the same tree) was shortened back, the bark removed and the wood itself left intact. And, most importantly, the exposed cambium around the wound was sealed with petroleum jelly. Despite the remaining branch stub having not been jinned yet (this is a jin as seen on an as yet unstyled tree), the aesthetic difference is immediately obvious.

Petroleum Jelly

Never use traditional bonsai wound-sealants or cut-paste on tree species such as Pine/Pinus, Spruce/Picea, and Larch/Larix that emit resinous sap when pruned. The wound-sealant does not stop the resin from leaking from the wound and this sticky residue slowly congeals into a grey-white mess. However, a smear of petroleum jelly stops the tree weeping sap and also encourages far quicker healing and callusing.

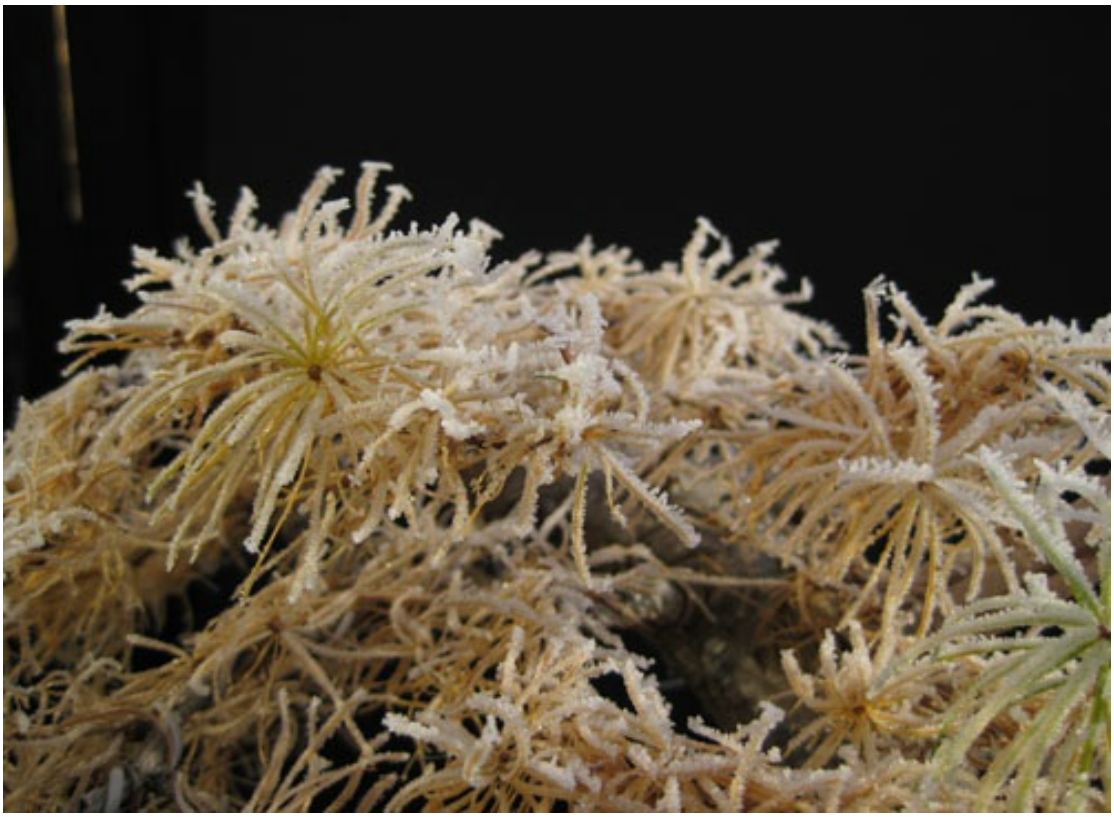
Normally (in the wild) a wound will weep resin over and around itself to

protect the callous that very slowly forms underneath. However, a layer of petroleum jelly seals the wound immediately stopping, the flow of resin as well as fooling the tree into callusing immediately into the soft, airless and watertight covering of what it believes is sap or pitch, but is in fact the petroleum jelly.

I cannot recommend Petroleum Jelly (or Vaseline as it is commercially known) enough and I now use it for all major wounds on my coniferous bonsai.

December 2010: The Larch still retaining some of its leaves after a heavy Winter frost.

December 2010: Larch are extremely frost-hardy trees and in the UK are known to happily tolerate temperatures below -20°C. The temperatures of -14°C that hit us during December 2010 were no problem for this Larch to endure and no winter protection was required.



December 2010: the apex of the Larch after a heavy frost.

December 2010: Just a week later and the Larch was hit by snow. As a tree species that is adapted to high-altitude and Northerly climates, such conditions are not a problem for the tree.

February 2011: In early Spring 2011, with the Larch having developed so well in the previous year, I decided to plant it into a good quality 'final' bonsai pot. I decided on using a round pot for the tree and Victor Harris of ErinBonsai.com gave me a chose of 3 pots, each of which would complement the bark as well as the Spring, Summer and Autumn colours of the leaves.

February 2011: 3 new pots from ErinBonsai.com for my Larch.

February 2011: The Larch repotted into its new pot in early Spring.

February 2011: The Larch was repotted into its new pot in early Spring. As the new pot was slightly larger than its previous plastic training container, no work was necessary on the roots and it was simply slip-potted into its new home.

Normally I would carry out structural pruning and wiring on a Larch either in Autumn or early Spring (before the buds begin to swell and are easily dislodged). However, with this particular tree having been defoliated and wired repeatedly through the growing season of 2010, little if any work on the branch structure needed to be carried out.

June 2011: With the branch structure of the bonsai established in the previous year, the tree was rested and allowed to grow freely through much of the growing season of 2011. New shoots in the apex were pinched out as they started to emerge; however, shoots in the lower branches were allowed to extend freely before then being pruned back.

This relaxed treatment left the tree looking temporarily untidy, however, the combination of free growth, heavy watering and feeding are all important to the health and vitality of a bonsai.

June 2011: A snapshot of the Larch growing in my garden, seen from the reverse-side.

August 2011: The Larch after partial defoliating, pruning and rewiring. Height 20”/49cm.

The second progression series in this chapter concerns another of the Larch purchased in March 2010 as field-grown material.

March 2010: A second Larch purchased as field-grown material, waiting to be potted-up.

March 2010: This Larch had a very straight but nicely tapered trunk where the lower branches had been allowed to grow freely (at the expense of the upper branches) while the tree had been developed in the ground. This caused the lower trunk to continue to thicken while keeping the upper trunk relatively slender.

Using exactly the same methods and techniques as described for the first

Larch in this chapter, the tree was pruned and potted up. All surplus growth that I knew would be of no use in the future design was removed and the tree repotted into a shallow plastic training-pot.

With the slowly-tapering straight trunk, this Larch immediately reminded me of a lone tree surviving high up in the mountains, with sparse foliage and a broken or jinned-top where it had been hit by lightening.

The branches would need to be raked sharply downwards to imitate the effects of heavy snowfall that would have sat on the branches each Winter, weighing them down. The top of the trunk would then be carved to imitate the effects of a lightning strike that would kill the top of the tree.

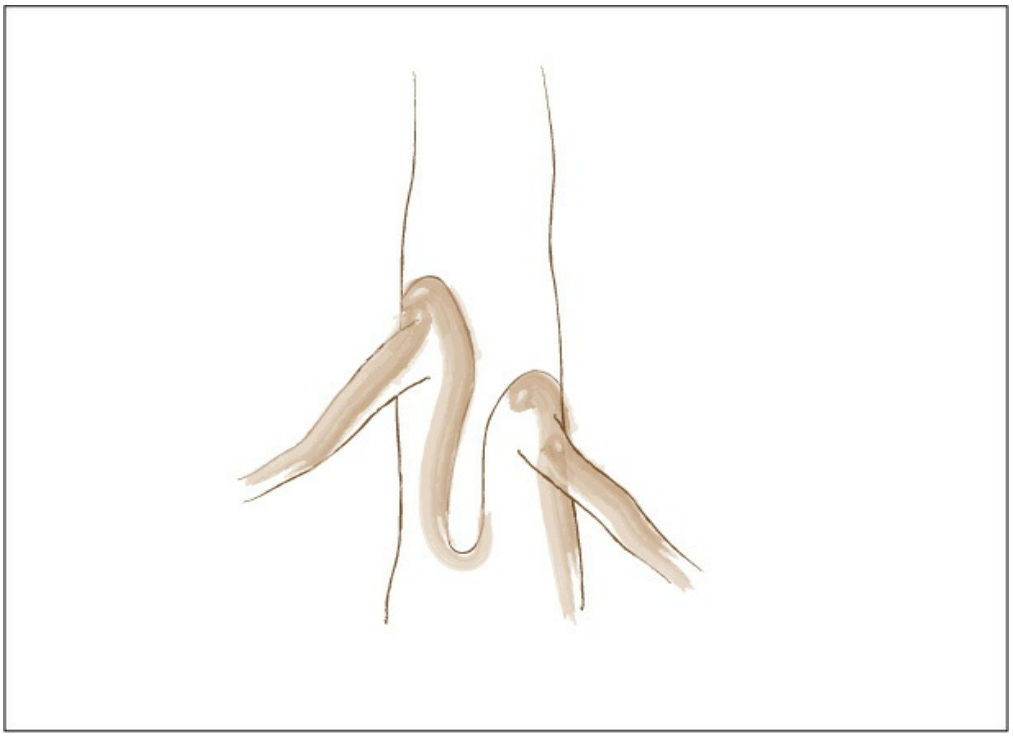
March 2010: The tree back in my garden a few hours later, pruned and

potted up.

May 2010: The Larch 6 weeks later.

May 2010: 6 weeks later and the Larch had come into leaf and was covered in new shoots beginning to extend. I already felt certain that the tree was more than strong enough to withstand styling and the process of implementing a design began.

At the end of May 2010 I stripped the bark from the top of the trunk. The best way to do this is to use a very sharp knife to cut through the bark and cambium (all the way down to the wood below) around the uppermost branches of the tree.



Rather than simply cut an unnaturally straight ring around the top of the live section, the cambium is cut so it rises over and above each of the uppermost branches, dropping in the gaps in-between them. What is important here is to avoid straight lines at all costs (as they look man-made) and never to remove the cambium from below a branch as this will interrupt the sap-flow from the roots to the branch itself, killing it. A draw knife was used to scrape all of the bark and cambium from above the line and then the exposed cambium of the live section was sealed with petroleum jelly.

The top jin was then burnt using a plumber's gas torch. Fire is an exceptionally useful tool to utilise when working with deadwood. Not only is it useful for removing tool-marks made when carving deadwood, it can also be used to instantly dry out and age freshly stripped wood (such as in this case) and also shape an otherwise dull jin.

As the wood is super-heated and begins to burn, certain sections of the wood will burn faster than others and when the burnt wood is brushed away it provides the beginnings of texture, movement and shape in the jin. A very useful side-effect of burning is that any wood that remains intact after firing, becomes hardened or ‘heat-treated’ and considerably less prone to rotting in the future.

For obvious reasons, always protect the foliage of the tree itself with foil

or wet rags if it is not possible to direct the flame well away from any nearby foliage. The wood can then be burnt with the gas-torch until it begins to glow red and burn. Allow the fired wood to cool down a little (spray water to speed cooling if required, or to put out unwanted fires!), and then use a wire brush to brush away the wood that has burnt and broken down as a result.

Late May 2010: Burning the top-jin.

There are three main different types of handheld wire brush commonly available to bonsai enthusiasts for working on their trees.

Brushes with nylon bristles are very soft and useful for cleaning the live bark of algae or other debris, particularly when used with water.

Brushes with brass bristles are stronger and are able to remove thin layers of bark with relative ease. While this can have disastrous consequences if used directly on the bark of many trees, it is useful for slowly brushing away the old bark on Junipers, cleaning up deadwood without causing damage and

for cleaning bonsai pots.

Brushes with steel bristles are very harsh and can easily cause damage to the relatively soft tissues of live wood and bark. They are, however, very useful for removing blackened areas after burning deadwood and even for adding light brush marks to jin and shari (note: always brush the wood in the direction of the grain).

After burning the wood and brushing it down with a steel brush, I then used a small router bit attached to a Dremel high-speed rotary machine to carve the wood, creating further character and interest. Finally, the jin had several coats of lime sulphur applied to whiten it.

May 2010: Detail of the Larch top-jin. In this image it is possible to see the marks along the grain of the wood, made by a steel brush, and the openings and hollows created using the Dremel. Also notice the line of the top of the live wood where it meets the jin.

July 2010: After partial-defoliation the Larch is wired and styled for the first time.

July 2010: During the following month I partially defoliated the tree and began to wire it. One of the most important aspects of placing the branches was to make them drop dramatically, to almost cascade down the trunk as though they spent half the year covered in the snow that then weighed them down. Most important is to make sure that the branches dropped abruptly

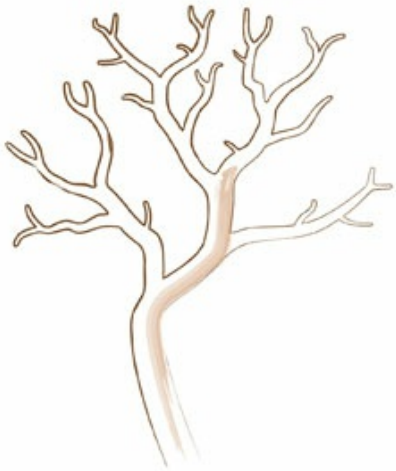
from the trunk and I avoided creating the unrealistic loops with the branches that can happen when insufficient bending is carried out, often caused by using too small a gauge wire and too tentative manipulation of the branch itself.

A poorly bent branch, the first section barely moved from its former position.

A branch having been bent downwards correctly, starting from the trunk itself.

Pruning and Arranging Larch and Deciduous Tree Branches

Visually, Larch can be treated as a deciduous tree when pruning and arranging the branches, that is, the branches are wired and laid out into a fan shape with an emphasis on taper and bifurcation (the division of branches into two smaller parts).



A deciduous branch seen from above.

When a deciduous branch is seen from above, the primary branch divides or bifurcates into two parts, the secondary branches, which in turn bifurcate into the tertiary branches.

Every time a branch bifurcates, the division results in two thinner branches, creating taper and a sense of scale to the viewer.

A deciduous branch seen from the side.

When seen from the side (or the front-view of the tree), a deciduous branch will be relatively shallow.

A heavily ramified branch (seen from the side) with little or no taper, and a less-well ramified branch with good taper.

The greater the difference in size between the primary and secondary branches, and the tertiary branches, the greater the sense of scale and age that is created. This is as important an aspect of deciduous branch building as is the creation of heavy ramification or twig density.

February 2011: The Larch is repotted into a bonsai pot from erinbonsai.com

February 2011: As with the first Larch featured in this chapter, the tree was repotted into a new bonsai pot in early Spring.

February 2011: The Larch after repotting, pruning and rewiring.

The Larch was pruned heavily to reduce the number of primary branches, creating a sparser foliage mass reminiscent of a tree at high altitude, and then rewired. With the tree out of leaf, the manner in which the branch structure had been built can be clearly seen. As new shoots appear each year it will be possible to increase taper and ramification in time.

August 2011: The Larch after partial defoliation and further wiring at Midsummer. Height 76cm/31”

Species Guide

Larix decidua/European Larch

BONSAI CULTIVATION NOTES

POSITION

Place in a sunny position. However, ensure leaves don’t scorch in full Summer sun (often caused by a lack of moisture at the roots), Larches will also grow well in semi-shade. Larch are extremely hardy and require no Winter protection until temperatures drop below -15°C to -20°C. Note that Larch carrying wire through the Winter have been reported to be less hardy.

Larches produce shorter, more compact needles in cooler climates similar to their native habitat. In hot and humid conditions their needles will grow longer.

WATERING

Keep evenly moist. Larch kept in full sun during Summer can become very thirsty.

In hard-water areas try to use rainwater or administer a fortnightly dose of ericaceous fertiliser to stop the soil becoming too alkaline.

FEEDING

Feed heavily as soon as buds appear in Spring with a high-nitrogen feed to force vigorous growth. This should be reduced for finished trees that require only fine growth. Continue to feed well until mid-summer when the tree will enter a semi-dormant period. From late-Summer onwards revert to a low-nitrogen feed to strengthen the tree for the coming Winter.

REPOTTING

Larches resent being pot-bound and need repotting annually or bi-annually in Spring as buds extend. Larch generally resent root disturbance. Do not bare-root and do not root prune heavily.

PRUNING

Hard pruning and formative pruning is best carried out in late Winter. Larches need judicious pruning at this time of year to retain their shape. Maintenance pruning should be carried out through the year by pinching back new shoots; allowing new growth to extend first before pinching back will allow the branches and trunk to thicken. For a coniferous species, Larches are very vigorous and can replace newly pruned growth within a matter of weeks.

WIRING

Larches are best pruned in Spring when the leaf buds are ready to sprout and the bare branches can still be seen. Care should be taken not to knock off new buds. Larch branches thicken rapidly and wire should be inspected regularly to ensure it is not cutting in. Old branches can be successfully wired, though if the bark is rough it can mark easily and the use of guy wires is preferable. Older branches may take a number of years to truly set into position and may therefore require repeated wiring.

PROPAGATION

Sow seed in early Spring. Cuttings can be difficult to root though semi-ripe cuttings can be taken in summer and hard-wood cuttings can be taken during Winter. Air-layering is successful and can be taken in late Spring.

PESTS AND DISEASES

Aphids and scale insects.

STYLING

Suitable for all forms except broom in all sizes

Chapter 3

Cotoneaster microphyllus/Small-Leaved Cotoneaster

Cotoneaster microphyllus/Small-Leaved Cotoneaster

Styling Series

Contrary to the belief that yamadori or wild trees are the only source of wonderfully old and gnarled bonsai, some of the best material can be found in our own back yards. Private gardens can yield domesticated trees and shrubs whose size and forms have been shaped for anything up to 50 to 100 years. The repeated pruning or even the repeated damage from human activity over a long period of time can give rise to material that is relatively small in height but with a big fat and very interesting trunk, all features that are excellent as material for bonsai.

The subject of this chapter is a Cotoneaster microphyllus or small-leaved Cotoneaster that had been discovered growing in a front garden by Faisal Waheedy.

Cotoneaster microphyllus/Small-leaved Cotoneaster growing in a private back yard.

Faisal often discovers raw material growing in the surrounding gardens of his neighbourhood and will often approach the owners asking if they would mind if he collects the tree or shrub for himself. More often than not the owners are more than happy to have what they see as an unsightly tree or shrub removed, free of charge!

The Cotoneaster after Faisal had dug it up and potted it up into a shallow terracotta training pot.

Cotoneaster microphyllus is an excellent subject for bonsai, particularly shohin and mame-size bonsai, with its minute leaf-size, readiness to respond to hard pruning, prolific flowers and berries.

Cotoneaster is frequently mispronounced as ‘cotton-easter’; the correct pronunciation is ‘cot-own-e-aster’.

As bonsai they have a reputation for being a little temperamental at times as some enthusiasts have had theirs die unexpectedly, however I find them to be a very tough species as long as a good quality, fast draining soil mix is used and the tree is fed the occasional dose of an ericaceous fertiliser, particularly in hard water/lime water areas.

Note that while Cotoneaster are not necessarily acid-loving, they do appear to deteriorate slowly in a pot when subjected to high pH conditions/hard water on a long-term basis. Bear in mind also that Cotoneaster as a genus are often found growing in very poor, thin and stony

soils and therefore require well-drained soil when cultivated in a pot and do not respond well to heavy fertilising for any length of time. Regular but light feeding regimes are preferred!

In the Spring of 2010, Faisal collected his newly discovered Cotoneaster and planted it into a large terracotta training pot using 'kittydama'/high-fired clay as a fast-draining soil medium.

As can be seen in the lower image on the previous page, given the tiny size of the tree's leaves, by comparison it had amazingly thick trunks (three in total), each with thick plated mature bark.

Having been pruned back to remove all the lower growth and suckers (unnecessary for a future bonsai design) the Cotoneaster was then left alone to recover from collection for the next 18 months.

August 2011: 18 months later and the Cotoneaster had not only recovered from collection but had thrived, growing several new branches of 50cm or more. At this point the owner of the tree asked me to style the Cotoneaster and so the process of finding the design within the tree began.

August 2011: The Cotoneaster had recovered well.

When I first viewed the now very wild-looking tree it was very difficult to see a bonsai design immediately; the three trunks were covered in potential branches but it was impossible to establish the best front and a design that would bring out the very best in the material.

So my first task was to remove all growth that I knew couldn't be part of a successful design. Shoots/potential branches growing from the base were removed, shoots of anything more than half the height of the trunk were shortened back. Where more than one shoot or potential branch emerged

from exactly the same point on the trunk, all but one were removed. The aim was to reduce the amount of growth to a minimum so I could find the design.....without reducing my options in terms of which angle would be the front of the tree, which shoots would form the new trunk leader and which shoots could be developed into branches.

August 2011: After hard-pruning.

August 2011: the hard-pruned Cotoneaster seen from a slightly different angle.

August 2011: the biggest disappointment at this point was the discovery that the thickest trunk (on the right) was entirely dead and had in fact rotted badly down to its base. Previous hopes that I would be able to use this trunk as the main feature of the design were dashed!

August 2011: After removal of the rotted main trunk and final heavy pruning, a front for the Cotoneaster was established.

August 2011: It was a disappointment to lose the thickest and heaviest trunk from the design but with the wood literally crumbling away, it was too rotted and unstable to save for any length of time, even with a wood

hardening product. So the trunk was removed piece by piece until I had taken it back to the base where the heartwood was still strong.

However, its removal led to the discovery that the two remaining thick trunks could now be seen clearly, they had pleasing movement and flowed together well and would make an excellent triple-trunk design along with a much smaller shoot growing at the bottom right of the base. Now it was possible for me to visualise a final design!

My final task for August was to slip-pot the Cotoneaster into a rectangular bonsai pot. It must be understood by readers that repotting a bonsai out of season, that is, outside of spring, is risky and can be very detrimental to the health and development of the tree. However, with experience it is possible to do this with certain tree species at certain times of the year.

August 2011: After slip-potting the Cotoneaster into a mica bonsai training pot.

In the case of slip-potting, the tree is carefully lifted from its container, excess soil that does not have roots growing into it is carefully removed and the tree is then slipped into a different container without disturbing the roots.

In terms of the design of the Cotoneaster as a bonsai, it is now possible to see how I had pruned the growth leaving myself plenty of shoots that could

be wired to form branches and how the new trunk-leader in the new main trunk had been pruned to provide natural taper and movement.

However, to solidify the design, I still needed to carve the trunks to add interest and taper as well as to remove more rotted heartwood.

September 2011: A couple of weeks later in mid-September, I began carving the deadwood of the Cotoneaster bonsai. Carving live wood (on trunks or branches) can be stressful to a tree, particularly when done in conjunction with any other kind of trauma such as repotting or heavy pruning and wiring. However, the vast majority of the carving carried out on the Cotoneaster was on already-dead areas where the cambium had previously died back and so caused little, if any, stress.

Mid-September 2011: Carving the Cotoneaster.

My main priority was to introduce taper to the dead areas of the trunks, in particular to the obliquely chopped top of the main trunk on the left. Using a Dremel and a mixture of small carving bits to remove the wood, I created a pleasing outline or silhouette to the trunks and the design overall, and then began to add shari and uro on the trunks themselves to create interest and drama on the otherwise quite bland surface.

Note in the image above that I have temporarily covered the soil surface

with old newspaper to prevent the open and fast draining soil from becoming clogged with wood dust as I carve.

September 2011: from the left-hand side of the trunk it can be seen that I had to split the top of the trunk into a left and a right section as previously the trunk was seen from this direction to have inverse taper.

September 2011: the Cotoneaster seen from the left hand side.

September 2011: After approximately 6 hours work, the carving was finished.

September 2011: Carving of the Cotoneaster took approximately 6 hours over the course of a couple of days, including time spent smoothing out the newly carved wood using a gas-torch and wire brushes. By the time I had finished, the trunks had been transformed into works of art in their own right.

September 2011: After wiring the branches.

September 2011: With the carving finished it was time to complete the styling process by fully wiring the branches so that each and every one could be placed exactly as I intended.

At this stage in the development, the trunks, the main front view and the 'feel' and 'emotion' of the composition has now been established. The coming years will see the refinement of the design as the taper of the branches and the ramification of the foliage increases.

Specific development will now be needed on the smallest of the three trunks (right of the base) which, while now established, looks insignificant in comparison to the two bigger trunks.

From above it is possible to see that, not only does the foliage mass as a whole lean forward, but each branch grows outwards into its own area of the canopy and therefore its own light.

Cotoneaster microphyllus; August to September 2011.

Detail image of the upper part of the main trunk.

The base of the Cotoneaster. The carved area in the foreground is all that remains of what was once the thickest trunk.

The remaining area of the largest trunk from a different angle.

Carved area seen from the left. At present the deadwood has been left untreated. Both myself and the owner Faisal Waheedy prefer the natural appearance of the wood to it being whitened using Lime Sulphur. Once the wood has begun to weather I will apply several coats of wood hardener to protect the wood from rotting in the future.

Cotoneaster microphyllus Shohin Bonsai. Height 11.5”/28cm with a 4”/10cm diameter trunk-base.

Species Guide

Cotoneaster microphyllus/Small-Leaved Cotoneaster

Cotoneaster is a genus of over 200 species of deciduous, semi-evergreen and evergreen shrubs and trees from woodland and arid, rocky areas in Northern Temperate regions of Europe, Asia and N. Africa. There are many species of Cotoneaster and even more varieties and hybrids suitable for bonsai cultivation.

SPECIES COMMONLY SEEN AS BONSAI

Cotoneaster adpressus/Cotoneaster

Small flowering deciduous shrub with pink flowers borne in early spring. 1 cm long dull, green leaves that turn red in autumn before leaf-drop.

Cotoneaster cashmiriensis (syn. C. microphylla var. cochleatus)/Cotoneaster

Compact, prostrate evergreen shrub with elliptic, glossy dark-green leaves up to 1 cm long. Bears solitary white flowers (pink in bud) in summer

followed by spherical dark-red fruit 6-8 mm long.

Cotoneaster horizontalis/Rockspray Cotoneaster

Spreading deciduous shrub with branches that form a herringbone pattern. Rounded to elliptic, glossy dark green leaves to 1 cm turning red in autumn. Bears pink-tinged white flowers in late- Spring in pairs.

Cotoneaster microphylla (now correctly known as C. integrifolius)/Cotoneaster

Stiffly branched, compact evergreen shrub with ovate dark green leaves 5 mm to 10 mm long. Solitary white flowers borne in summer followed by red/pink fruit.

BONSAI CULTIVATION NOTES

POSITION

Full sun. Though fully hardy as garden plants, Cotoneasters need some protection as bonsai from temperatures below -5°C.

FEEDING

Feed sparingly every 10 days to 2 weeks. Cotoneaster are not a hungry species and do not require or respond particularly well to heavy fertilising regimes. In areas with hard (lime) water, use an ericaceous fertiliser.

REPOTTING

Annually in spring as new buds extend. It is important that a fast draining soil mix is used.

PROPAGATION

Sow seed in containers outside in autumn. Layer in spring, root softwood cuttings in summer.

PESTS AND DISEASES

Aphids, scale insects.

Developing Bonsai From Airlayering

One of the best ways of propagating material for bonsai is by airlayering branches from mature field (or garden) growing trees.

It enables bonsai enthusiasts to obtain healthily-rooted material of anything up to 10”/25cm in diameter, with mature bark, good movement and advanced age.

This method of obtaining material for bonsai is an easy technique to master for enthusiasts of all levels, and is one that can produce results of a very high standard in a relatively short period of time.

Chapter 4

Acer palmatum/Japanese or Mountain Maple

Acer palmatum/Japanese or Mountain Maple

Progression Series

Acer palmatum are among the most beautiful trees there are for the garden, with their graceful growth habit and delicate 5-lobed leaves.

Across the range of the species there is much variation in growth habit, leaf size and leaf shape. Spring, Summer and Autumn colours are rarely short of spectacular, creating stunning displays of reds, oranges, pinks and yellows.

As bonsai these characteristics can be captured in a small pot. Their popularity is ensured by their ready ability to respond to many bonsai techniques; their delicate appearance belying a strong and resilient nature.

Acer palmatum, commonly known as Japanese maple or the Mountain Maple, is the focus of this chapter and this particular subject started life as a thin branch on a mature Japanese Maple growing in my garden. During the Summer of 2002 I air-layered a number of 1 cm thick branches (see Appendix 2), separating the rooted branches in late Summer before potting them up.

October 2002: the air-layer planted on top of a ceramic tile in my garden.

October 2002: In October of the same year, the small tree was planted out into my garden in order to fatten up the trunk over the forthcoming years. Due to the nature of air-layering, the tree already had excellent surface roots and was planted directly on top of a ceramic tile to encourage strong lateral growth.

When one compares the first image of the tree (above) with the very last image taken, in 2011, it is possible to see that the air-layer is shown from what would become the back of the tree as a bonsai.

July 2005: The Acer 2½ years later, still being allowed to grow freely in the ground in order to thicken the trunk.

July 2005: Except for a move to a new position in my garden, the tree was allowed to grow basically unhindered for the next 3 years. Mountain Maples are exceptionally vigorous trees and given enough fertiliser, water and sunlight, they put on a lot of girth in a relatively short period of time.

The tree was planted in full sun and given a general-purpose slow release fertiliser twice a year (in Spring and then at Mid-Summer) as well as a fortnightly high-nitrogen liquid feed.

After four years of growing in the ground and heavy-fertilizing, the Acer had become very vigorous, reaching a height of over 2 metres, causing the

trunk to thicken noticeably.

By **July 2006** I had a growing-plan for the development of the trunk that would create good movement as well as ensuring the trunk had taper. As indicated in the image above, over the previous years I had allowed particular shoots to extend freely so they could thicken the trunk from the point that they emerged. My intention was that, when I harvested the tree from the ground and potted it up during the following Spring; I would remove all growth bar the trunkline itself and then begin to build a new branch structure from the new buds and shoots that appeared on the tree as a result.

July 2006: my proposed trunkline for the tree as a bonsai. The black lines show my intended trunkline; the red lines show the growth being allowed to extend freely to help thicken the trunk.

However..... as can happen from time to time and to my great annoyance, shortly after this image was taken, the tree was damaged by a local child retrieving his football from my garden and the middle and upper sections of

the tree as well as their sacrificial growth, were snapped off!

As indicated in the image above, a new trunkline was found and changing the future image of the bonsai from being a relatively short tree, with dynamic movement and fast taper, into a relatively tall tree with graceful movement and slow taper. The proposed design for the tree changed from being a tree seen in the short view to a tree seen in the long view.

July 2006: After damage to the tree while it was still growing in the ground, the branches marked in red were lost and a new prospective trunkline, marked in black, had to be found.

Near and Far Views In Bonsai - How Perspective Effects Trunk Taper and Bonsai-Styling

Bonsai are often described as having form and style.

The form describes the shape of the trunk (sometimes also referred to as its style). For instance, the form might be informal upright form, the cascade

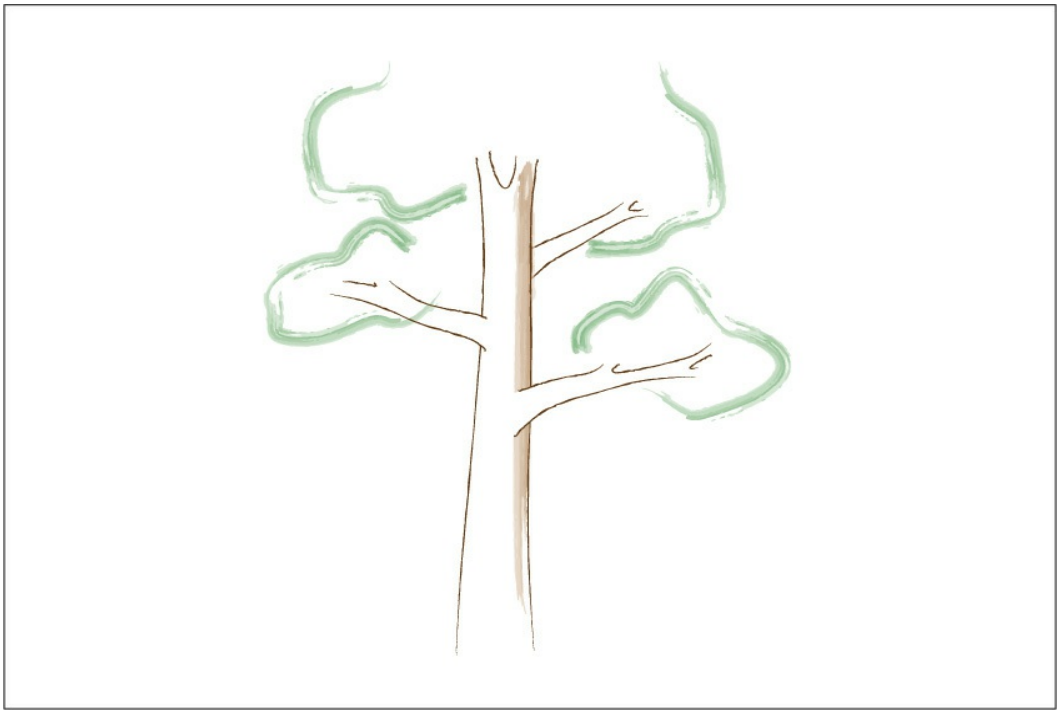
form or the broom form.

The bonsai style is the term used to describe the manner in which the tree is styled and presented; a classical or ‘Pine’ style with horizontal branching as one would expect a Pine to be or a naturalistic style, showing the branching one would expect of a deciduous tree.

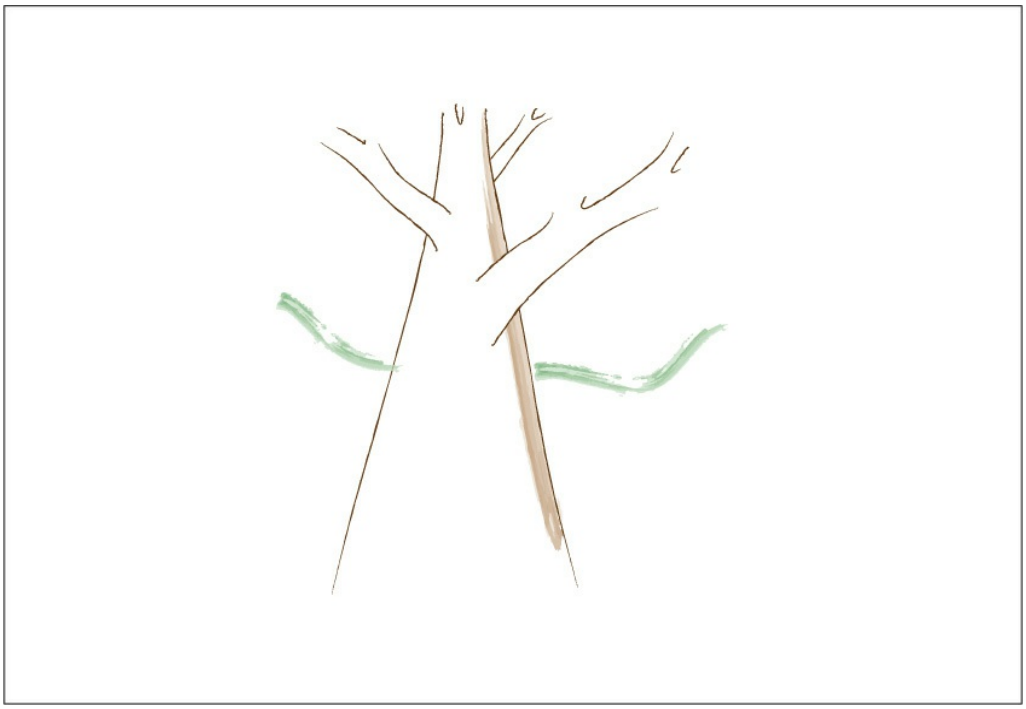
A third descriptive term which might be considered is the view at which the tree is seen. Is the tree seen from up close, as if standing at its base looking upward (near view) or at a distance as though seen on the horizon (the long view)?

Why Is Establishing the View Important?

Trees seen in the near view exhibit different features from those seen from afar; trunk taper, branching, foliage density, even the appearance of deadwood can be affected by the intended view or distance at which the tree is intended to be portrayed.



A tree seen at a distance (the far view).....



.....and the same tree seen as though standing at its base, looking upwards (the near view).

The near view (looking up the trunk as though stood at its base) is the view that is more popularly used for bonsai. The trunk at its base (in front of which the viewer stands) is the widest point and can appear to be massive. Looking upwards, perspective means that the trunk looks thinner as the eye travels up it and the trunk gets further away. This means that the top of the trunk, which is furthest from the viewer, looks very narrow in comparison to the base.

When a field-growing tree is seen from the near view, even a fairly uniform trunk will create an illusion of taper. The greater the amount of taper between the base of the trunk and its top, the more the tree appears to tower over the viewer.

In terms of bonsai, a trunk ratio of 6:1 or greater (height: trunk diameter) is used to help convey an image of a tree towering over the viewer. The lower the ratio, the greater and more severe the image becomes.

Far view trees, however, are seen as though they are on the horizon as part of the landscape.

Scots Pines seen in Norfolk UK, in the far view.

The far view is commonly used for group plantings and literati form trees but it can be used equally for any form of bonsai such as informal upright or broom.

In the far-view, the base and the top of the trunk are seen from the same perspective. The trunk does naturally taper from its widest point at the base up to its thinnest point in the apex. However, unlike a trunk seen in the near view, the trunk taper is slow or much less severe as the perspective does not 'add' to the natural trunk taper.

Trunk Taper Defines the View

When styling a tree for bonsai, the shape and movement of a trunk define the form of the bonsai. That is whether it will be an informal upright, a cascade or formal upright.

In the same way, the taper of the trunk defines the view of the bonsai.

A well-tapered trunk with a trunk height to trunk diameter ratio of approximately 6:1 or less is suitable for a bonsai in the near view.

A trunk with slow/slight taper with a height to diameter ratio of 6:1 or more will be suitable for a bonsai in the far view.

There are subtle differences when styling trees of one view or another. A well-designed bonsai will reflect the view at which it is seen throughout the styling process, from the structure of its branching to the choice of the final

pot. Mixing near view and far view characteristics can produce a confused image of a tree.

Near View Characteristics

A tree in the near view will have the following characteristics: In this (near) view, the branches will appear to be very wide. Standing at the base of a tree, the branches reach a long way to the left and the right; an approximate foliage width (at the base) of 2/3 the height of tree's height would be appropriate for an informal upright design.

As the branches are seen from the same perspective as the well-tapered trunk, the branches should also diminish noticeably in size the higher up the trunk they are. The first branches will be long and thick, the uppermost branches short and thin. This creates a foliage mass that is, overall, triangular. Create branches of similar thickness and length on a heavily tapered trunk and the mixed perspectives will not look satisfactory.

Cedrus libani at Tatton Park with light branching, less dense branching; negative space is evident.

Seen from below in the near view, the foliage mass is dense and heavy. Little light is able to penetrate through the branches.

Deadwood features should be more heavily grained as they are seen closer up (in the near view) where it should be possible to see that natural deadwood (jins and shari) are not just a smooth expanse of white wood.

The same branches seen from below are very dense.

Far View Characteristics

A tree in the far view will have the following characteristics: The branching appears a more natural width. Approximately 1/3 the overall height of the tree for an informal upright design. From this far view, the branching is seen at a distance and is more natural. The branches from base to top of the trunk have less difference in thickness and are of more similar width; the familiar scalene triangle is less pronounced or even absent. (Note that the lower branches should still be longer and thicker than those at the top; however, there should be less exaggeration than when seen from the near view perspective.)

The foliage canopy should be lighter. At a distance, the mass of foliage should be broken up with negative space (areas without foliage).

Deadwood features have less detail. If the viewer is to be made to believe that the tree is a distance away, highly detailed jin and shari should not be visible.

Bonsai in the far view should be planted in shallower but wider pots that create an impression of a landscape.

Why is it Necessary to Establish the View at All?

Many of the bonsai rules or, more properly, guidelines are aimed at

producing an image of a tree as seen from below (in the near view). This can dictate a trunk height to diameter of 6:1 or less, heavy lower branching and lighter branching in the apex and a foliage mass that forms a triangular shape.

But, in trying to create a more natural, realistic bonsai, one can also take a more natural view of a tree. That is, as seen from a distance where the rules of perspective have less influence on the overall design.

The majority of trees, both young and old, do not have to have massively tapered trunks; in fact the majority of old trees we see in our day-to-day lives have trunks with quite slow taper.

However, to portray a natural tree seen from a distance, one also has to reflect the natural characteristics of a tree seen from a distance.

Using near view characteristics on a slow tapering tree will very often just produce a bonsai that simply looks very young and immature instead of an image of an old tree seen on the horizon.

Finally...

In writing this article I have given two extremes by way of explanation: a tree that is seen from its base and a tree that is seen in the distance. There is no reason why a tree has to be strictly one or the other; there are a range of views in between. The range and subtlety of these characteristics should therefore differ accordingly.

Whether it is the slow, subtle, taper of a tree seen faraway on the horizon or the heavy, abrupt, taper of a tree seen close-up, all bonsai should have trunks with a degree of taper. A bonsai without taper will always look like a young tree!

February 2007: the roots of the Acer after lifting it from the ground.

February 2007: In early Spring as the Spring buds began to emerge, I harvested the Maple. Digging up the tree was fairly straightforward, as the ceramic tile on which it had been growing had ensured that there were no deep-running tap-roots.

I began to bare-root the roots, removing all of the ground-soil so that I could then plant the tree in a high-quality soil consisting of high-fired clay granules. The rootball is shown in the image above after being soaked in water and easing away the ground-soil with a chopstick. As can be seen, the 40 cm+ diameter rootball was flat and very shallow; excellent properties for bonsai. However, there were still big improvements that could be made to the nebari.

February 2007: Finding the improvements that could be made to the nebari.

February 2007: Japanese Maples, as with all other Acer species, have excellent characteristics for developing a good nebari; they produce new roots readily, callous strongly and graft easily, making them very receptive to root-work.

It would be very unusual to lift a tree from the ground where it has been growing wild to find a perfect nebari and this tree was no exception. Whilst the rootpad was already impressive, there were still many ways in which it could be further improved.

The image above shows some of the improvements that could still be made. There were noticeable gaps in the nebari where roots, or at least substantial roots, hadn't emerged (arrowed in black). With some tree species this 'fault' must be accepted, however, grafting new roots to a Maple at this stage of growth (while it is still very fast growing and vigorous as compared to a refined specimen growing in a bonsai pot) is fairly straightforward.

Arrowed in blue is a thick root that had produced a prominent 'knee' or 'elbow' bend that looked ugly compared to the smooth transition from the

trunk that the other roots had. The solution to this problem would be to cut away at the wood, removing the ‘knee’. This I did immediately. With an Acer species the wound would eventually callous over, nonetheless it would take a number of years to heal completely and the quicker I started the process, the better!

Marked in white are some well-shaped surface roots. But they could be improved over the forthcoming years by encouraging them to become a consistent diameter; at that time there was a mixture of a small number of thick roots and many thinner ones. By pruning the roots according to their size and vigour for a number of years, they could be encouraged to become one consistent size and thickness. To begin this process I pruned back the thicker roots hard, making them comparatively weaker than the thinner roots that I pruned sparingly.

Finally, the root marked in red is too thick, long and dominant compared to the rest of the nebari. This would need to be pruned back hard each year for many years until the surrounding surface roots caught up in size and thickness.

Once I had finished root-pruning, the tree was planted into a large nursery container. This would allow stronger growth than in the confines of a bonsai pot, allowing me to develop the branch structure of the tree more quickly.

August 2007: the base of the tree 7 months later. Notice the cut-paste covering the wound on the right-hand side of the nebari where I removed the 'knee' at Midsummer.

August 2007: As has already been noted, the front of the trunk had a large gap in the nebari. New roots could be prompted to grow from this point using a number of hit-and-miss techniques; however, the roots would have been very thin, taking many years to thicken to the same girth as the surrounding surface roots.

The fastest way to introduce a suitable root into this position was to approach-graft a young tree into the gap in the trunk base. Once grafted, the trunk of the young tree would eventually become a root of the main tree itself.

Approach-Grafting New Roots

Preparing a Scion for Approach-Grafting New Roots

The scion or seedling/sapling tree to be grafted needs to be prepared and shaped in the months prior to grafting. This is necessary so that it will fit into position at the base of the main trunk. Suitable scions can be obtained from seed, cuttings, or air-layering.

For the majority of approach grafts, the scion should be:

(a) bent so that there is an ‘elbow’ in the scion that can be inserted into the channel in the main trunk, and

(b) the part below the elbow grows into the soil surface at the same angle as the surrounding roots of the main tree.

(c) The part above the elbow has room to grow freely (allow it to grow out, away from the trunk and branches of the main tree).

(d) Though not essential, if you have the opportunity, train the roots of the scion as shown in the diagram above.

(e) Prune the scion roots in the Spring before grafting so that they are reasonably compact and can be replanted into the soil of the main tree later on in the year. I would not recommend any root-pruning of the scion at midsummer itself.

Timing: Speed of Callusing vs. Health

of the Seedling When Making Approach-Grafted Roots

When approach-grafting young seedlings to the base of a bonsai, there is something of a quandary. Is it better to make the graft in the Spring/during dormancy when it is safer to disturb the roots of the seedling but wound healing or callusing of the bonsai is poor or non-existent? Or, do you make the graft during the Summer when the graft will take more quickly though it means exposing and disturbing the roots of the scion while it is in leaf?

I believe it is a case of weighing up the risks of both die-back of the channel edges and the possibility of poor or slow grafting or the risk of exposing the roots of the seedling during the growing season. Roots can be, and are often, approach-grafted to many species in early Spring but I would thoroughly recommend summer grafting for those species with poor callusing characteristics or species with a tendency to die-back around the edges of wounds.

In general, I prefer to carry out all approach-grafts during the Summer. To minimise any risks to the scions, I ensure that they are root pruned as appropriate during the preceding Spring and planted individually into small seed-pots so that the scion can be lifted from its container and planted (and grafted) to the main tree with minimum disturbance.

Separating the Newly-Grafted Root

The exit or 'top' of the scion will become noticeably thicker than the entry or 'bottom' of the scion. This allows one to determine that the scion has grafted to the trunk.

Obviously, it is the base of the scion that is kept and so the exit or 'top' of the scion is removed and dressed, almost as though it is simply a low branch being removed.

In the case of newly approach-grafted roots on deciduous and broadleaf species, I find that there is a tendency for the scion to produce new buds and shoots for anything up to 2 years after grafting. These should be removed as and when they appear.

Failure of an Approach-Graft

Approach-grafted roots cannot really fail and die; they simply take a very long time to graft to the main or host trunk. However, there are several reasons why an approach-graft can be very slow to graft to the main trunk.

Firstly, it is of great importance to recognise that strong callusing of the

main trunk is necessary for the cambium layers of the scion and main trunk to be forced together in order that they can graft. Strong callusing is produced by fast growing, healthy and vigorous trees and tree species.

A sick, weak or slow-growing root bound bonsai will not callous strongly enough to graft very quickly. Equally, the scion must be healthy, well-fed and allowed to grow freely in order that it thickens enough for its cambium layer to be forced against the cambium layer of the main tree.

Lastly, patience is essential. Successful approach-grafting is not a quick process.

August 2007: After cutting a channel into the trunk-base ready to receive the scion.

It is important to use a tree of exactly the same species and variety when approach-grafting new roots. In theory any type of Acer would have successfully grafted, however, it was important that the identical variety was used to ensure that the bark colour and texture would match the roots of the parent tree. Fortunately, I had a suitable air-layered sapling from the same tree in my garden as the Maple had come from 5 years previously, and so I was able to use this. Knowing that it would be advantageous to graft another 3-4 surface roots to the base of the Maple in the future, I took another half

dozen air-layers during the Summer of 2007 ready to be grafted the following year.

A channel large enough to receive the air-layered sapling (scion) was cut into the front of the trunk base of the Maple using a sharp knife to cut through the bark and cambium layer. I then used a gouge to hollow out a little of the wood underneath it so that the scion would fit snugly. Soil was then removed from the area where the scion would be planted, causing as little disturbance as possible to the surrounding roots of the main tree.

The sapling was inserted into the channel I had made at the base of the Maple and was securely fixed into position, using a brass screw and an aluminium wire staple to ensure it would not be accidentally knocked out of position while it grafted.

As can be seen in the on the next page, the scion still had the green bark seen on young Acer palmatum/Mountain Maples. However, the effect of being covered in damp soil would soon change the appearance of the bark to that of its neighbouring roots.

As with newly approach-grafted branches, the graft having been sealed with wound sealant, the scion then needed to be allowed to grow freely and vigorously until such time as the cambium layers of the scion and main trunk base grafted together.

August 2007: the newly grafted scion in place at the base of the Maple.

Further Example of Approach-Grafting: Adding New Roots to a Field Maple/Acer campestre

Grafting new roots is not a difficult technique to carry out. However, it is much harder to know in which situation approach-grafting is appropriate. Much depends on individual tree species and individual specimens.

Field Maple or Acer campestre with a very poor nebari in 2006.

The above image shows the back of a second Acer campestre bonsai with its surface roots uncovered during repotting in early 2006. Though there are roots at the back of this trunk, they are much lower in the soil than the rest of the surface roots, making them unsuitable for a pleasing nebari.

Previous attempts to prompt new roots have included a wire tourniquet (still visible in the image above) and drilling holes in the trunk that are then filled with rooting hormone (this can sometimes prompt new root growth around the wounds).

Despite the tree still being in the development stage and growing vigorously, the tree refused to comply! And so I decided to approach-graft a new nebari.

Summer 2007: The same tree after making 6 approach-grafts over the previous 18 months.

In total, 6 approach-grafts were made to the back of the tree over the next 18 months. In the image, the roots had just been fitted into position but as yet not sealed; just visible is the tiny brass screw holding the sapling in place.

Spring 2010: After 3 years the grafts had taken and were ready to be tidied up.

Spring 2010: 3 years later and the grafts at the back of the trunk had healed well. Having been allowed almost free growth since 2006 to

encourage a strong graft-union, the graft stock was pruned back hard in early 2009 to encourage the sap to flow into the main trunk rather than continuing into the top of each grafted sapling itself.

Spring 2010: After trimming back and tidying up the approach-grafts during repotting.

Spring 2010: During repotting of the tree I took the time to tidy up the approach-grafts, removing the tops of the scions back to their point of grafting with the main trunk itself. With a species such as Acer campestre the resulting wounds will callous within one or two to three years.

August 2007: The Japanese maple with the new graft at its base.

August 2007: Having lifted the Maple from the ground in early 2007 and with the trunk developed, the tree had been planted into a large black nursery container while I began to build the branch structure. As is normal at this stage of development, the lower branches were allowed to extend freely to help to thicken them while the upper branches were pruned 2 to 3 times over the course of the year to make sure that they did not become too thick.

November 2007: After Autumn pruning and wiring.

November 2007: As I have described previously, as soon as the leaves fall from deciduous trees in Autumn, I take the opportunity to prune and wire them. At this time of year, the majority of the 'energy' (the sap and sugars) of the tree has been stored in the trunk and roots of the tree, and heavy pruning at this time ensures that no energy is lost, as it will be held in reserve ready to be poured back into producing new buds and shoots from exactly where I need new growth during the following Spring.

Autumn pruning and wiring is particularly advisable (where minimum Winter temperatures permit) on Acer species, as the branches are still pliable and much less likely to snap than when wired in Spring. Pruning wounds made on an Maple in Autumn will not bleed (as they are prone to do in Spring) and, for 2 to 3 weeks after the last leaves fall, fresh wounds still heal over.

At this point I had a number of older branches that had emerged during the time that the tree was still growing-on in the ground and these had then been pruned back hard over the previous year, producing nice thick primary branches on which to grow thinner secondary branches. The advantage of this

should be immediately obvious in the branch taper that had already been achieved.

What had been lacking was a low-down branch on the right hand side of the trunk. Fortunately the tree had issued a couple of buds from around a large wound on this side of the tree in early 2007 and, throughout the year, I had encouraged maximum growth in the resulting shoot so that it could ‘catch-up’ and become as thick as the surrounding primary branches as soon as possible.

July 2008: the approach-graft at the base of the Maple has begun to graft into position.

By **July 2008** the approach-graft made on the nebari had been in place for a year and was healing well. My hope was that within a second year, the cambium layers of the scion and trunk-base would have swelled and grafted together sufficiently for me to remove the top of the scion, leaving a new ‘root’ in place.

July 2008: A second scion approach-grafted into place.

By **July 2008** I had another 3 scions, and these were also grafted into place.

July 2008: Three new scions were added to the trunk base, each filling a gap in the nebari.

July 2008: In total, three new scions were added to the trunk base, each filling in a gap in the nebari.

December 2008: Having had more roots grafted to its base during the Summer, the tree had been allowed to grow freely for the remainder of the growing season. As soon as the leaves fell from the branches, the tree was pruned and wired again.

With the trunk and the primary and secondary branches established, the development of the above-soil parts of the tree now centred around increasing the ramification, the number of tertiary branches, on the tree.

Throughout 2009 I began an annual cycle of pinching out the extending tips of the new shoots in Spring, allowing the resulting growth to extend freely before defoliating and pruning back at Midsummer. This was followed by the task of pruning and wiring the tree thoroughly in Autumn as soon as the leaves fell.

December 2008: After pruning and wiring the Japanese Maple.

March 2010: The Maple finally potted up into a bonsai pot by ErinBonsai.com

March 2010: As the buds began to extend and unfurl during the Spring of 2010 I potted the Japanese Maple into its first bonsai pot. For a species as feminine as an Acer palmatum and a tree styled in the far-view, I used a shallow oval pot that completed the impression of a tree seen on the landscape. (See APPENDIX 4: Choosing the Right Pot for your Bonsai.) The length and width of the pot also gave me plenty of room to fit the roots on the surface of the pot.

The approach-grafts appeared to have grafted to the base of the trunk successfully and I had begun to prune the scions regularly to encourage the sap-flow from the scions into the main tree itself.

Note: only those areas of the nebari that are 'finished' were left exposed; areas that still required adventitious roots to emerge and fill in empty gaps in the surface were kept covered by a thin layer of soil.

May 2010: The spring yellows and reds of the Japanese Maple beginning to turn to the green of Summer.

May 2010: As the colour of the Spring foliage faded back to the fresh green of Summer on my newly potted Japanese maple, I took the opportunity to photograph it.

May 2010: The trunk-base and nebari of the Maple.

May 2010: One problem that owners of younger Acer palmatum have (it should be remembered that in 2010 this tree was just 10 years old, including the time the original air-layer spent as a branch on the parent tree growing in my garden) is that the bark takes around 10-15 years to turn from an immature green colour to the smooth beige-grey of more mature bark.

There are ways, however, of reducing the time taken for the bark to age. As one might notice in the image above, the bottom 10 cm of the trunk itself has already taken on a mature appearance and this had occurred when the tree was planted in the ground with a layer of continually damp ground-soil surrounding the trunk-base. Damp conditions will greatly reduce the time for the juvenile green bark to disappear and I had kept my approach-grafted roots covered with a layer of soil for the first 6 months after applying them, to ensure they took on a similar mature appearance as their neighbours.

The trunk itself is more difficult to age in appearance unless one were to resort to wrapping sphagnum moss around it for a year and keep the moss permanently damp (not something I find particularly attractive, though this technique does indeed work). However, I find that gently abrading the green bark with a very fine sandpaper or brass-wire brush every 6 months to lightly damage bark causes it to take on a mature appearance as the bark heals.

November 2010: The author making final adjustments to the tree after Autumn pruning and wiring.

November 2010: The middle section of the Maple after Autumn wiring and pruning.

November 2010: As each year passed the taper and ramification of each branch slowly increased. Straight sections of growth had movement applied to them, branches with long internodes were removed and no more than two buds or shoots were allowed to emerge from any one branch junction. New shoots from the current year's growth that had hardened off were wired and then positioned so that they could grow into their own space in the canopy. And then the tree could be enjoyed throughout the Winter before erupting into fresh growth during the following Spring.

November 2010: Newly wired and pruned shoots.

November 2010: Newly wired and pruned shoots.

Spring 2011: The vibrant red of the emerging Spring leaves in April.

Spring 2011: April heralded the emergence of the vibrant red leaves of Spring on my Acer palmatum and, finally, after nearly 9 years of development from what had once been a small sapling, the Maple had taken

on the appearance of a mature tree seen growing in a meadow, surrounded invitingly by lush green grass.

May 2011: The fresh green colour of late Spring and early Summer.

May 2011: Within a few weeks the leaf colour of the tree had changed to the vibrant green of Summer.

May 2011: The Japanese Maple seen from the left-hand side. Notice the way that the tree gently leans forward towards the viewer.

June 2011: Defoliating the Acer palmatum.

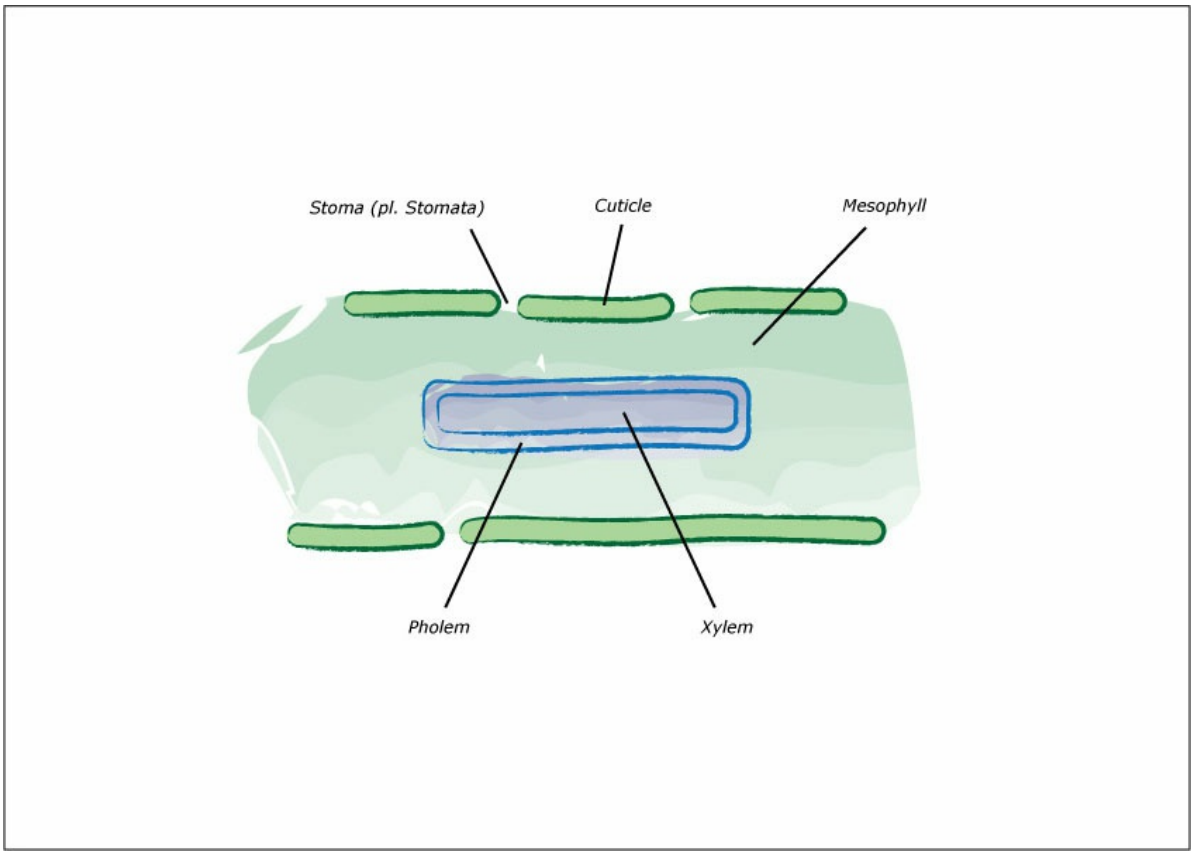
June 2011: With the exception of years where the Acer had been heavily root-pruned in the Spring and therefore wasn't quite as vigorous as normal, I defoliated the tree in June, around Midsummer, removing all of the leaves.

June 2011: removing the leaves of the Maple, leaving the petiole (leaf stem) behind.

Function of Leaves

Leaves are the place where the tree processes sugars in a process known as photosynthesis. Using light as a catalyst, water from the roots and carbon dioxide absorbed from the air, the leaves produce sugars within the mesophyll cells. These sugars take the form of glucose (carbohydrates) which in turn provides growth energy to the plant.

Across the surface of a leaf (the Cuticle) are small pores called stomata which, during daylight hours, absorb the carbon dioxide necessary for the process of photosynthesis. At night, when light levels drop, the process of photosynthesis ceases and the stomata expel excess oxygen and other gaseous by-products.



Cross-section of a leaf.

During the day, carbohydrates produced by the process of photosynthesis are temporarily stored within the leaves themselves but, at night, they are translocated via the phloem layer of the trunk and branches to areas of the tree where they are required for growth.

A second function of leaves is to allow water to evaporate through their surface in order to keep a constant flow of water throughout the whole tree. This flow of water allows the distribution of nutrients gathered from the soil by the root system throughout the entire tree.

Tree species have evolved a range of foliage types to allow them to cope with differing moisture and temperature levels throughout the world. Some species, such as pines and spruces have a waxy coating to help conserve moisture during the winter when their roots are frozen and unable to replace lost moisture within the tree. This coating also prevents snow and ice adhering to the upper leaf surface, blocking the stomata and effectively suffocating the tree.

Other trees such as Eucalyptus and many coniferous species have

developed coatings and leaf shapes that prevent too much transpiration of water in hot, dry weather. Other species have fine hairs which reduce the effect of drying winds by reducing airflow over the leaf-surface.

Species such as Japanese Maples, have a native habitat that is naturally sheltered from the sun and wind and have developed only very thin skin or cuticle. This means that in less favourable conditions they are liable to sun and wind scorch.

Nearly all plants possess the characteristic of absorbing water and minerals through the leaf surface. Conifers usually have a greater capacity to absorb water than broad-leaved trees. Even though the amount of water absorbed by leaves is not sufficient for growth, it can still maintain a minimal life mechanism in the plant. In the case of root decay, transplanting, or serious root damage in a conifer, water sprayed onto the foliage will supply the conifer with water for absorption. In the case of broad-leaved trees that are still in leaf, spraying with water helps prevent the evaporation of moisture from the leaf-surface.

June 2011: After defoliation.

Mid-November 2011: The Acer palmatum showing Autumn colour.

June 2011: Once the leaves had been defoliated there was an ideal opportunity to be able to study the new growth that had appeared since the Spring and to prune and wire as necessary.

New smaller leaves and more refined growth begin to emerge 4-6 weeks after defoliating an Acer palmatum and, other than pinching out any overly vigorous individual shoots, the tree was allowed to grow freely until Autumn.

November 2011: One advantage of defoliating Acer palmatum is that they then tend to show stronger colours in Autumn and 2011 was no exception, with the tree first turning a mixture of yellow and orange.

Mid-November 2011: 5 days later and the leaves had changed colour again.

Mid-November 2011: Just 5 days later and with the leaves about to fall, the foliage had turned bright red.

Autumn/Fall Colour

All of us are familiar with the rich and vibrant colours of the leaves on our bonsai in Autumn, but what is the reason for the change in colour before they fall?

Senescence

The process in a tree that produces Autumn colour and causes leaves to fall is known as Senescence. Senescence is normally initiated when the nutrients, produced by the leaves, slow down in the reduced light and

temperature levels of Autumn. Shorter days, longer nights and changing light quality all help throw internal switches within the tree itself.

Senescence physically begins by the production of a seal across the base of the leaf. On the leaf side of the seal, the leaf cells weaken and start to become thinner. On the opposite side of the seal, the food transport cells (phloem) become more tenuous.

The cambium cells continue to supply water to the leaves to replace any moisture lost through evaporation as normal. All the time the leaf base cells weaken until it is only the water connections that hold the leaf onto the tree. One by one the leaves lose their hold and fall to the ground. The wound left on the tree is the outward face of the constructed wall established to keep the cold of Winter outside.

Changing Colours

The green colour of leaves comes from chlorophyll. Chlorophyll production in a tree slows with the onset of senescence in Autumn, at the same time, longer nights and cooler temperatures help to break apart the chlorophyll in a leaf.

As the base of the leaf begins to seal, leaf starches (or stored food) are broken apart and, shipped out of the leaf into the tree itself. What chlorophyll remains continues to power the remaining live cells within the leaf itself.

As the green of chlorophyll breaks up and disappears from sight, other pigments remain in the leaf: red, orange and yellow Carotenoids and yellow and tan Xanthophylls.

These pigments were originally made to shield and protect the chlorophylls. Now the chlorophylls have gone, the remaining colours can be seen.

Behind all of these brightly coloured pigments lie the deep brown of the tannins and the light browns of the tree tissues. As the leaf colour eventually fades, it is these browns of the leaf skeleton that are left.

Improving Autumn Colour in Bonsai

When the chlorophyll component of a leaf breaks down quickly and early in Autumn, the remaining coloured pigments are brighter and last longer; Autumn colour is improved. There is no real precise way of promoting this but there are factors that can improve colour:

>Cold early Autumn nights speed up the start of Senescence and increase the strength of colour and length of time that the coloured pigments can be seen.

>Leaves containing lower levels of chlorophyll, as a result of midsummer leaf-cutting/ defoliation, or trees that have been fed low doses of nitrogen through the year, will take less time for the chlorophyll to exit the leaf and will also display better Autumn colours.

December 2011: Newly wired apex. Notice the wire marks on the branches.

December 2011: A week after the last leaves had fallen; I carried out my annual refinement of the now-bare branches, pruning and wiring the branch structure thoroughly. This wire will be begin to cut into the branches during next Spring as the new shoots extend and the existing branches begin to swell. However, on Acer palmatum, it is advantageous to allow the wire to cut in slightly as this is one species where wire-marks heal relatively quickly. Allowing the wire to stay on for a few extra weeks ensures that the branches set into their correct positions properly. Compared to many other deciduous trees, the branches of Japanese Maples have a habit of springing back into their old positions.

2007 to 2011: The 1.5”/3.5cm diameter wound at the front of the trunk has healed well over the past 4 years. Visible in this image are the ‘annual rings’ of callous that have formed each year around the wound.

As can be seen in the above image, the wound halfway up the front of the trunk, created when I removed the original damaged trunkline, has calloused well and should be fully healed in another couple of years. Although there is no aesthetic reason why Acer palmatum cannot be seen with deadwood features, their ability to heal and callous so strongly mean that only the largest of wounds need to be hidden or dressed.

None-the-less, Acer palmatum will not fully heal over rotting or rotten wood; a useful attribute to have for a wild tree as it ensures that rotting wood is not readily-sealed fully and is allowed to ‘breathe’. It does mean that, to ensure the callous on an Acer palmatum heals fully, a wood-hardening product should be applied to the exposed wood. Common practise is also to gently ‘damage’ the edges of the callous each Summer (when callusing is naturally at its strongest) to encourage the tree to repair itself around that point. It is, however, only necessary to gently abrade the callous with a steel brush or fine sandpaper.

December 2011: This large wound has not healed over. It is near the top of the trunk where the regularly pruned new growth above it in the apex does not encourage rapid callusing. This (slightly larger) wound will take another 4 or 5 years to fully heal.

December 2011: This fully healed wound was made in 2005; it has benefited from being positioned at the base of the trunk, where the new growth of the entire tree runs down the trunk and around it. This has encouraged very rapid healing of what was once a large wound.

Of the four approach grafts, the first one made in August 2007 has naturally healed best and has already blended well into the surrounding nebari. Further callusing in this area over the next few years will make the graft virtually invisible.

December 2011: Detail of the first approach-grafted root, made in August 2007.

December 2011: Detail of the first branch on the left and the nebari below it.

December 2011: The branch structure of the bonsai as seen from above. Over the years, every time new shoots have been wired, they have been positioned radially into their own individual part of the canopy and branch taper has been a priority.

December 2011: Finally, seen from the front, the bonsai itself displayed at its best, out of leaf, when the entire structure of the tree can be enjoyed to its fullest.

Height 24”/61cm, trunk diameter above the base 2.5”/6cm. Current surface root spread 10”/25cm

Species Guide

Acer palmatum/Japanese Maples

Acer palmatum are deciduous small trees and shrubs, with opposing five pointed leaves, native to Japan, China and Korea. There are at present hundreds of varieties in cultivation. Palmatum species are separated from other Acer species within their genus by way of their 5 pointed leaves.

They are very popular for use as bonsai, due to their ready ability to respond to most bonsai techniques, beautiful foliage and graceful branch

structure.

Across the range of the species there is much variation in growth habit, leaf size, leaf shape and Spring, Summer and Autumn colour.

Varieties or cultivars with a green Summer leaf colour tend to be more robust whilst red-leaved varieties (though arguably more beautiful) lack the same quantities of chlorophyll in their leaves and are weaker. Flowers and key-shaped fruit tend to be insignificant and easily overlooked.

One of the main problems with looking after Acer Palmatum is keeping the very thin leaves free of blemishes, as they are easily burnt by the sun and wind.

Japanese Maple Cultivars

It would be difficult to describe every Acer palmatum variety or cultivar in detail; instead those most commonly used for bonsai are described below.

Red-Leaved Cultivars Used For Bonsai

These include Seigen, Chishio, Deshojo and Purpureum. All have red leaves in Summer. Seigen and Chishio have feathery leaves and bright orange red Spring colour. Both of these cultivars have a naturally more dwarfed habit.

Purpureum and Deshojo have broader leaves and are blue/purple toned in comparison. All red leaved cultivars are more susceptible to leaf damage in the Spring (before the leaves harden) from strong sun, winds or frost. However, all will start to lose their red pigmentation if kept in deep shade for more than a few days. Red leaved varieties are naturally weaker and slower growing than green leaved cultivars as they lack the same quantities of chlorophyll in their leaves.

Rough-Barked Cultivars Used For Bonsai

These varieties have an aged, rough textured bark, even at a relatively young age (5-10 years). Though there are a small number of Acer palmatum with this characteristic, the most vigorous and well suited to bonsai cultivation is the ‘Arakawa’. This has light green leaves that turn yellow in Autumn.

Dwarf Cultivars

There are a number of varieties of A. palmatum that have a naturally

dwarf habit and are very suitable for bonsai cultivation. Most commonly seen are ‘Kiyohime’, ‘Kashima’ and ‘Yatsubusa’. All have naturally small leaves, shoots, branching and trunks.

With the majority of Acer palmatum varieties it is necessary to build foliage density but these dwarf cultivars have naturally dense foliage and often need their leaves thinning to allow light inside the canopy.

Dwarf cultivars (particularly Kiyohime) tend to be basally dominant. Unlike the majority of plant species, the apex is weak and less dominant than the basal/lower growth and branching. Strong lower growth needs to be kept in check to ensure that the apex does not weaken too much.

Dissectum Varieties

Varieties with dissected leaves tend to be slow growing and naturally weaker than other Japanese Maples. Many have a weeping or cascading growth habit. Obtaining suitable stock that has not been grafted is very difficult, making dissectum bonsai a rarity.

BONSAI CULTIVATION NOTES

POSITION

The general advice is to keep Japanese Maples out of direct sunlight and strong winds throughout the year to protect leaves against sun and wind scorch. In the UK I keep my healthy Maples out in full sun all Summer. However, those in warmer climates should always err on the side of caution and provide protection during the hottest parts of the day and during the height of Summer.

In all climates, good light in Spring and Autumn promotes vigour and leaf-colour. In winter, protect against frosts below -10°C.

WATERING

Acer palmatum are very thirsty prior to new flushes of growth in Spring and Summer and will need additional water.

Japanese Maples that are dry at the roots are also far more susceptible to sun and wind scorch.

FEEDING

Feed weekly with high nitrogen fertiliser, as soon as leaf buds open in Spring, to encourage strong growth and to strengthen leaves against sun and

wind scorch. Withdrawing some early fertilising produces very short internodes and finer growth required on ‘finished’ or developed trees. After the first flush of leaves has hardened off, feed fortnightly with a balanced feed. Japanese Maples will tolerate heavy feeding regimes to encourage very vigorous growth and quicker trunk-thickening.

REPOTTING

Every 1 or 2 years as buds extend in Spring, until the tree is over 10yrs, then as necessary in a basic soil mix.

PRUNING

Unless extension is required to form new areas of foliage or branches, cut new growth back to one or two pairs of leaves following bursts of growth through the growing season. For trees that require short internodes, buds can be pinched out leaving 2 new opposing leaves as soon as they are visible. This will produce fine, twiggy, growth with short internodes and also promote back-budding. Remove all growth with long internodes.

Leaf-cutting can be carried out in Midsummer. This results in smaller leaves, better ramification and stronger autumn leaf colour. However, defoliation should only be carried out on healthy trees, never in the same year as repotting, never 2 years running and never on weaker red leaved varieties.

Hard-pruning and formative pruning should be carried out in Autumn after leaf-fall (preferably within 1 week) or during the Midsummer semi-dormant period when wounds can heal very quickly. Never prune during Spring as all Acer species have a habit of bleeding profusely, which can severely weaken the plant or even result in the loss of branches. Ensure all wounds are sealed.

For trees that are displayed for their bare winter silhouettes, Summer pruning might be considered.

WIRING

Wiring can be carried out at any time from early-Spring to late-Autumn though each period carries its own advantages and disadvantages. Optimally, wiring should be carried out on bare branches before bud extension in Spring, after leaf cutting in Midsummer or after leaf-fall in Autumn. At these points in the year the branch structure is not obscured by foliage and there is enough sap remaining in the branches to keep them supple.

Spring wiring should be carried out with care as the new buds can dislodge very easily and wire can quickly start to mark the bark after the rapid growth of spring. Trees wired after leaf-fall in Autumn should be protected against heavy frosts as branches will not heal properly until the Spring growth period. During the Winter, branches become exceptionally brittle and can snap without warning; only very gentle wiring should be attempted.

PROPAGATION

Sow seed as soon as ripe. Air–layers are the principal source of propagation and should be carried out as soon as spring growth hardens off in May. Cuttings strike easily but can have a high failure rate and can take 2 or 3 seasons to grow vigorously.

PESTS AND DISEASES

Aphids, scale insects, caterpillars and viruses including Verticillum wilt. Plants weakened by lack of fertilising, poor root systems, repotting, under or overwatering, lack of dormancy, are more likely to suffer burnt leaves.

STYLING

All forms except literati in small to extra-large sizes.

Additional Information

Some varieties of Acer palmatum have variations in growing area dominance. Shrubby varieties such as Kiyohime are basally dominant and, unless care is taken when pruning, can have very sparse apices.

Suitability for very hot climates is questionable. In extreme Summer temperatures there can be an endless struggle to keep the leaves in good condition or even intact on the tree. Acer palmatum also require a dormant period (Winter temperatures of less than 10°C for at least 44 days). Trees can survive a few seasons without a dormant period but lose their vigour and this can lead to their eventual demise.

Acer palmatum are very suitable for thread and approach-grafting of new branches and new roots.

Avoid grafted nursery trees often seen for sale in UK garden centres (one Acer palmatum variety grafted on top of a more vigorous understock trunk). Only purchase grafted nursery trees grafted specifically for bonsai with a

very neat graft low down on the trunk.

Advanced Techniques

Acer palmatum/Japanese Maples

This species guide is intended as an advanced supplement to the basic species guide.

The techniques discussed here are not necessary for the very basic care of Acer palmatum bonsai, but do describe the tree in greater detail and can be applied for the development and care of superior specimens of this species.

Ordinary Trimming

Prune back to 1 or 2 pairs of leaves after new growth has reached 3, 4, 5 pairs (depending on position on the tree). Large individual leaves can be removed, leaving the petiole/leaf stalk, as and when necessary.

Gradually these leaves will be replaced by smaller and finer foliage, leading to a denser canopy. To thin the canopy and allow light to penetrate the canopy to the inner branches, remove growth close the trunk, leaves that fall beneath the level of a branch and any over-sized leaves.

Defoliation

Defoliation can be practised at Midsummer on healthy trees only. Weaker red-leaved varieties should not be defoliated. Green-leaved varieties respond well, but it is recommended that they not be defoliated 2 years in a row or in the same year as root pruning. The aim of defoliating Japanese maples is to increase budding (and, therefore, leaf and twig density), produce shoots with shorter internode length and, lastly, decrease leaf size.

Defoliating weak trees may not necessarily kill them but will not produce the desired effects and in some cases will promote the opposite effect: a small number of large leaves on branches with long internodes.

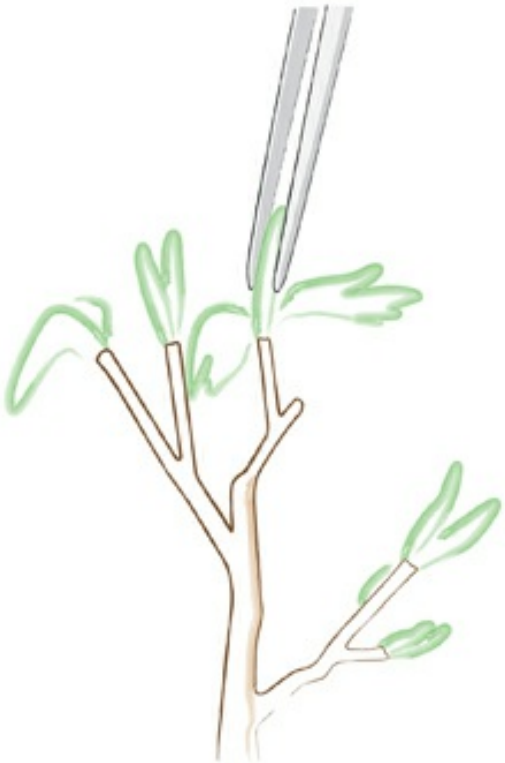
Branch Pruning

Acer palmatum bleed heavily if pruned in early Spring. This can be stemmed to a degree if the tree is root pruned beforehand. I find it preferable to carry out general maintenance pruning and thinning of the branch structure in Autumn after leaf fall. For the removal of large branches or trunk chops that will cause large wounds, mid to late Summer is the best time for these jobs as healing and callus formation is rapid. Avoid making large wounds

before Midsummer, as callus formation can be very poor and result in dieback of the area around the wound.

Pinching Back Acer palmatum

The main objective of pinching back Acer palmatum growth is to keep internodes short. Acer palmatum branches with long internodes have poor ramification and denseness of foliage. Creating branches (and trunks on young Maples) with short internodes means that creating a tree with dense foliage is much easier.



To achieve this objective, the first shoots in Spring should be pinched out. The most vigorous shoots are the first to open in Spring and so pinching these out will remove all shoots that have the potential to produce long internodes. With tweezers, open the newly opening leaves just as they begin to open and pinch out the central shoot. If you wait until the central shoot can be removed with the fingers, the internodes will have already extended too much. A second, weaker, budding will follow in 2 to 3 weeks time with shoots that have shorter internodes. The most vigorous shoots open first. By pinching the

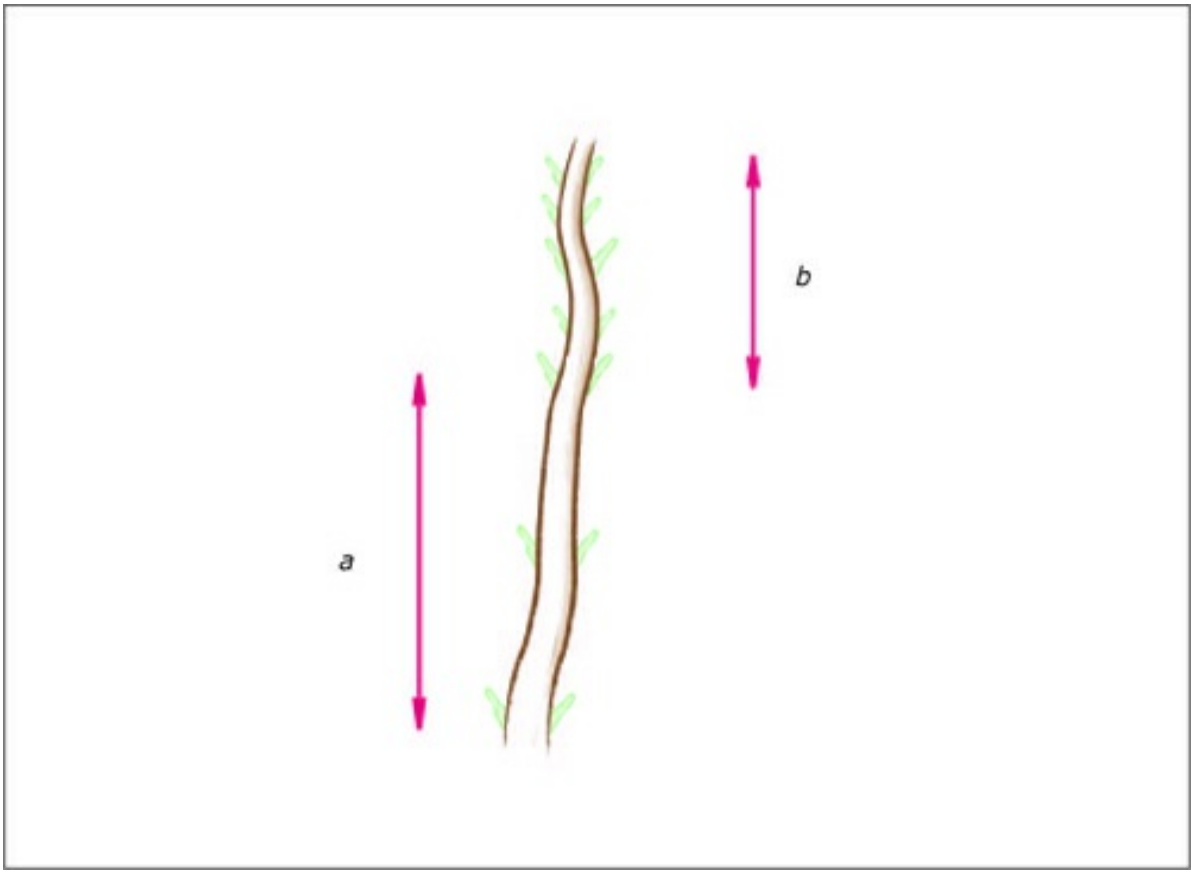
first crop of new buds to open, you help balance the tree's vigour throughout the whole tree. Energy and vigour is diverted to the slower, weaker, buds on the insides and lower parts of the tree.

Pinching Back Dwarf Varieties

The growth of dwarf varieties such as Yatsubusa and Kiyohime is usually quite balanced. However, due to their basal dominance, the strongest shoots are pinched back a little later than on ordinary Palmatums and this encourages back budding on the interior of the branching.

Acer palmatum Internodes

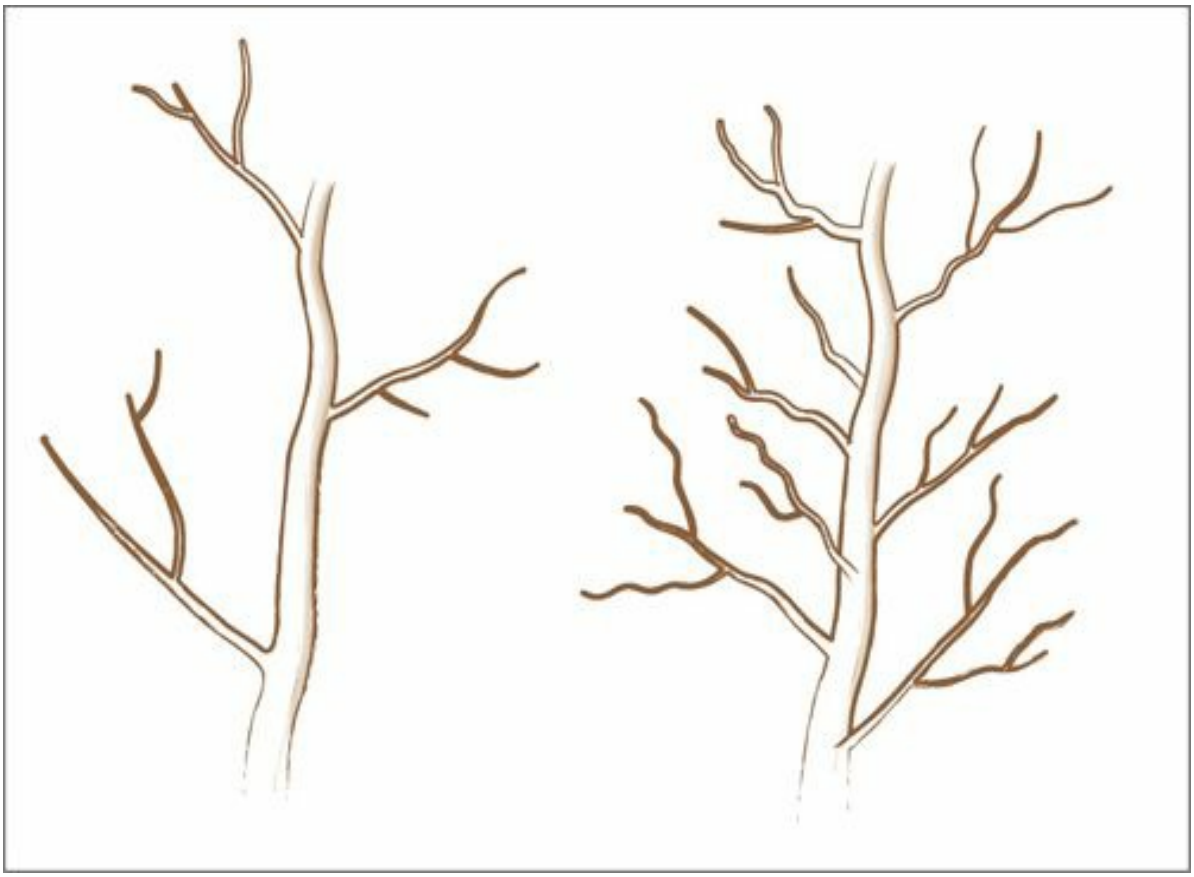
With all deciduous species it is useful to retain shoots with short internodes (the distance between the leaf-pairs) and remove those branches with long internodes. Long internodes can be especially prevalent with Acer palmatum and, in order to produce good foliage density, must always be addressed.



Long internodes (a) and short internodes (b).

Vigorous, immature, growth on all Acer species will very often have long

internodes.



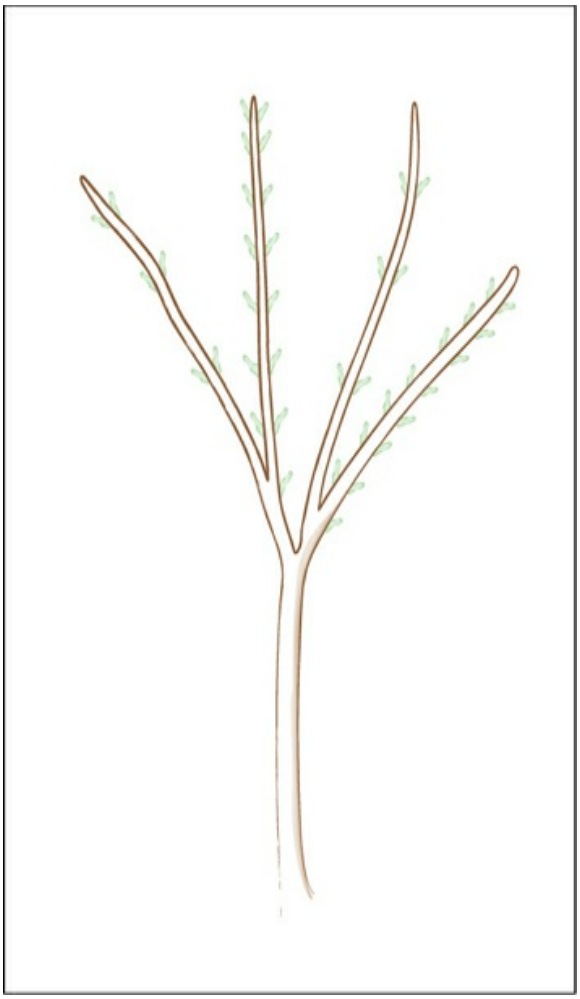
Ramification being built on a branch with long internodes (left) and on a branch with short internodes (right).

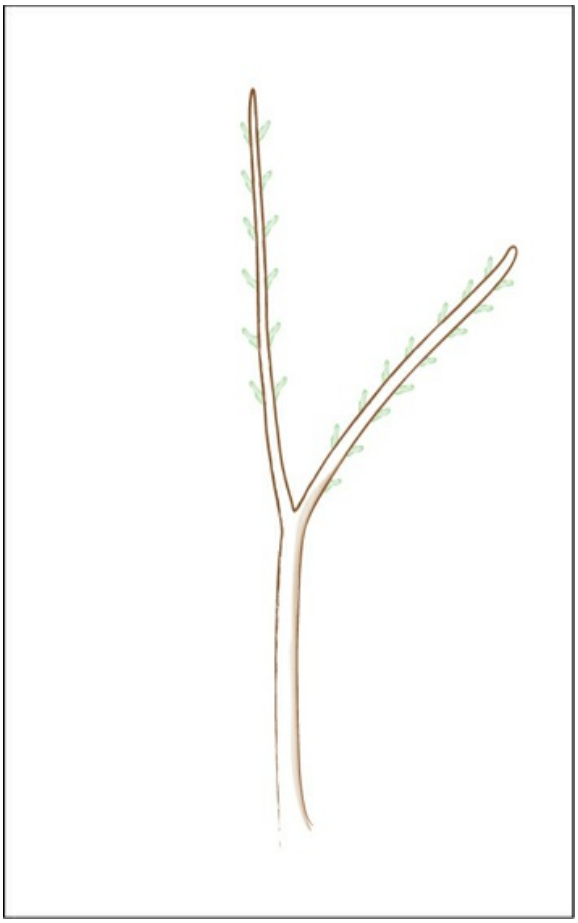
This is problematic because the distance between any future branching that occurs at the nodes will be too long. These areas with long internodes will find it difficult to create a dense canopy resulting in blank or bare areas of the trunk or canopy.

Whilst pruning, if you have a choice of shoots or branches to remove, always try to prune back those with the longer internodes. This will help achieve good foliage density in the future.

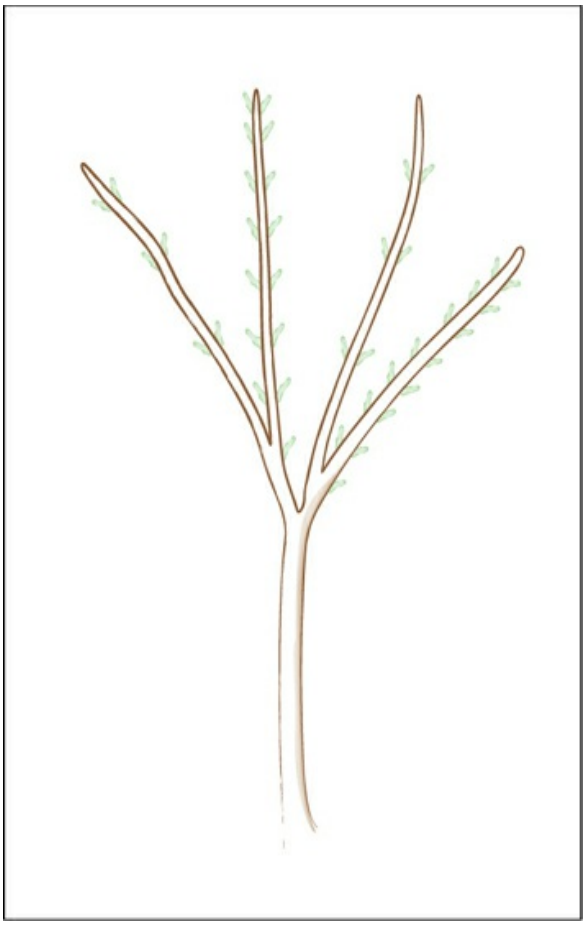
Keeping the shoots with longer internodes will lead to sparser foliage in the future.

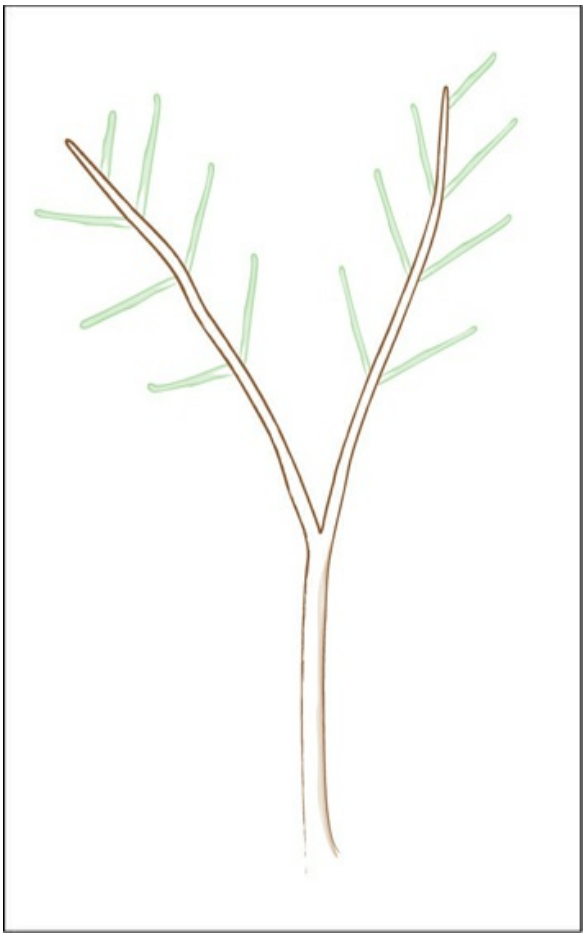
The occurrence of long internodes increases when an Acer is especially vigorous and/or has a reduced number of buds through which to direct its energy; for instance, after trunk chopping or hard pruning.





Whilst pruning, if you have a choice of shoots or branches to remove, always try to prune back shoots with the longer internodes. Keeping the shoots with shorter internodes will help achieve good foliage density in the future.





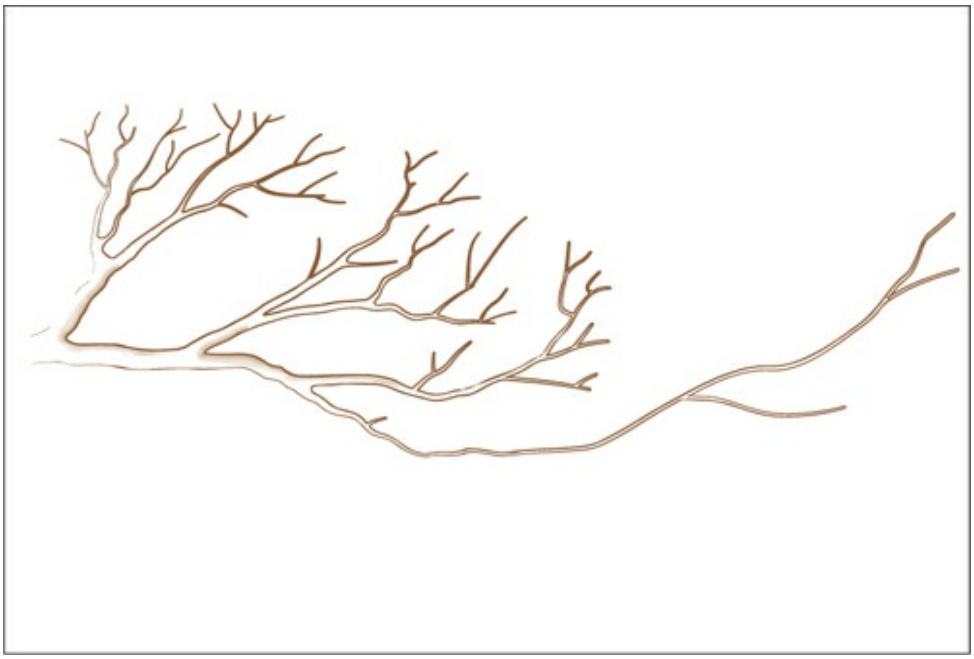
Keeping the shoots with longer internodes will lead to sparser foliage in the future.

One method of combating long internodes is by using what I term a ‘sap drawer’.

Using a Sapdrawer

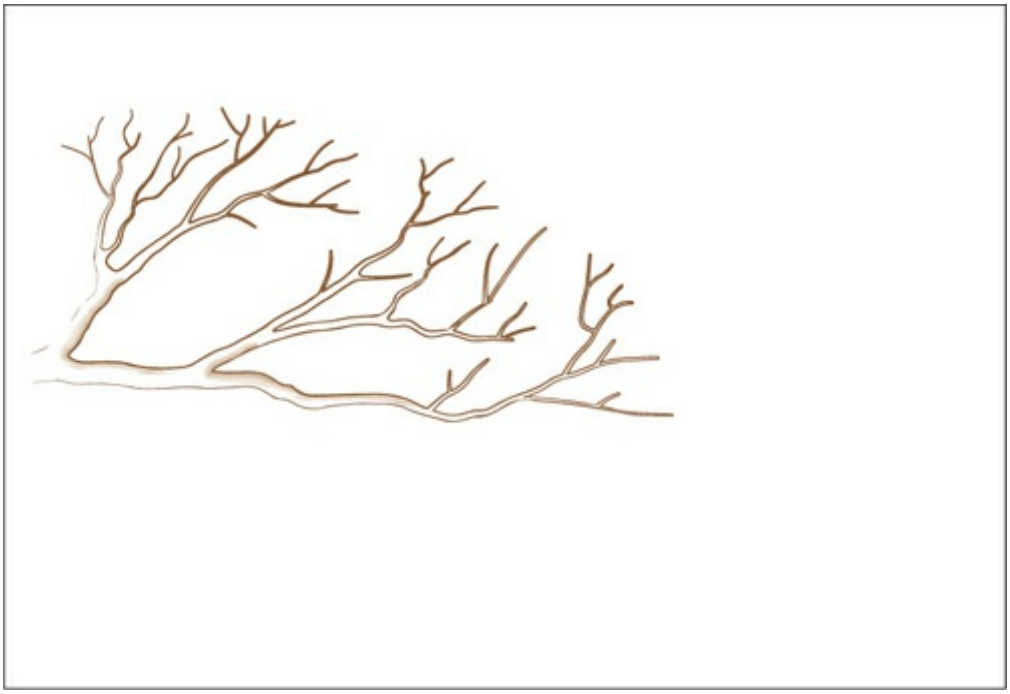
Again, this is a technique that can be applied to many deciduous tree species but is especially useful for all Acer species (Trident, Field as well as Japanese Maples).

After bud break, pinch all apical buds with the exception of one that will become the sapdrawer.



The sapdrawer will be used to ‘soak up’ the excess energy of the tree and protect the other branches from developing long internodes.

When the first flush of growth slows after bud break (in Spring, after bud break or to a lesser extent, after defoliation) the sap drawer can be removed. The sapdrawer can be left and allowed to grow for an extended time to help thicken the whole branch if necessary.



Positioning Acer palmatum

It is always recommended that Acer palmatum be protected from the sun and wind as the leaves are liable to sun and wind scorch. However this advice is more applicable to the US, Australia, and similar climates. In the UK, my experience of Acer palmatum is that strong, well rooted and healthy Japanese maple bonsai can be kept in full Summer sun. Good light conditions ensure smaller leaf size; better back budding, denser foliage with stronger autumn colours.

Specimens with weak or reduced root systems due to poor soil conditions, or having been recently root pruned, will have difficulty supplying enough moisture to the leaves in strong winds or bright sunlight and leaf scorch WILL occur. These trees should be afforded a more sheltered position outside. If you are unsure of the vigour of your Acer palmatum bonsai, or the effect of your climate on this species, err on the side of caution and provide protection against the sun and wind in Summer.

Developing Material From a Bonsai Nursery

Many enthusiasts will try making their first bonsai from Nursery Stock. In this case 'Nursery Stock' means ordinary trees and plants intended for planting in the garden or landscape that can be purchased from Plant Nurseries and Garden Centres.

Nursery Stock can be useful subject matter to practise wiring and pruning on, and indeed, can be successfully turned into bonsai. However, it takes some experience and luck to create a good quality bonsai in this way.

Bonsai Nurseries however will often offer far better quality material for styling and development. Often the stock will already have a sizeable trunk, the roots will have been given sufficient training to fit into a relatively small container and there will be an abundance of branches with which to build a convincing branch structure.

Developing material purchased at a Bonsai Nursery requires a certain level of artistry and skill lest the potential of the tree is lost through overzealous pruning or even the loss of the tree through over-working it. Nonetheless, creating a successful design on such material can be one of the most satisfying aspects of bonsai.

Chapter 5

Juniper chinensis ‘San Jose’/San Jose or Chinese Juniper

Juniper chinensis ‘San Jose’/San Jose or Chinese Juniper

Progression Series

The San Jose Juniper is best known in bonsai for its blue-green foliage and beautiful red bark. A naturally low-growing spreading Juniper that rarely reaches a height of more than 50cm in its native central Asia, the San Jose was named after WB Clark of San Jose, California who introduced the variety in 1935. The San Jose Juniper is known for being very hardy, requiring a slightly acidic soil and at least 5 hours of full sunshine through the growing season.

June 2009: Chinese Juniper ‘San Jose’ as originally purchased by Faisal Waheedy, seen from the back.

This particular San Jose was acquired by Faisal Waheedy in June 2009 from a bonsai nursery where it had been roughly styled and planted as a cascade bonsai.

Originally a garden plant, the tree had a nice thick trunk and was very healthy. However, despite its potential it was also a little awkward. Its main problem was that the middle section of the trunk was very straight and this was why the previous owners had tried to style it as a cascade.

September 2009: The deadwood being lime-sulphured after the Juniper’s first styling session.

In **September 2009** Faisal took the Juniper to a bonsai artist who carried out some work on the deadwood at the base of the tree and decided the tree would look better if it were turned into an informal upright bonsai. After repotting at its new angle in a rectangular bonsai pot, the tree was left in the

corner of Faisal's garden where it was allowed to grow wild while awaiting further styling.

October 2011: The Juniper had become overgrown after 2 years of free growth.

By **October 2011** the San Jose had become wildly overgrown and Faisal agreed to let me style and implement a new design that I hoped would bring the best out of the tree.

While being far from a refined bonsai, allowing the tree to grow freely with just a cursory prune every 6 months had successfully invigorated the Juniper. When I brought it back to my garden and inspected it closely, it was immediately obvious that the tree was in excellent health, had settled down enough to produce plenty of mature scale foliage and was ready to be worked on hard!

The straight middle section of the trunk.

My primary aim for the design of the tree was to do something about the awkward straight middle section of the trunk. Though it would be possible to cover the trunk from the front-view of the tree with foliage, I didn't believe this was the best solution as it would not hide the other awkward visual element of the trunkline; caused by the middle section of the trunk being longer than the first section.

The first diagram shows the trunkline of a generic informal upright bonsai (coniferous or deciduous). The trunk tapers as the eye travels from the bottom to the top. One of the purposes of creating taper in the trunk is to create the illusion of standing at the base of a huge tree looking upwards; the further the eye travels up the trunk, the thinner it becomes. This creates an illusion of great height in a tree potentially just 10-20cm tall.

If the diminishing length of each trunk section (between each drop in trunk diameter) also enhances this illusion of great height.

If we keep the taper but remove the diminishing length between each trunk section by extending the second section, the positive effect of taper is lost. This is due to the conflicting message that the long second section creates in our eyes.

With the tree having such a short trunk-base and such a long middle section, the Juniper created a conflicting message to the eye. My solution was to 'shorten' the length of the middle section by changing the front view of the tree and utilising a technique I call 'foreshortening'.

Foreshortening

fore•short•en (fôr-shôr'tn, for-) pronunciation

tr.v., -ened, -en•ing, -ens.

1. To shorten the lines of (an object) in a drawing or other representation so as to produce an illusion of projection or extension in space.

2. To reduce the length of; curtail or abridge.

The Use of Foreshortening in Art

When an artist paints a 3-Dimensional object onto a flat 2-Dimensional canvas, it is necessary for the artist to illustrate the depth of the object to the viewer.

The artist must use visual effects or 'optical illusions' to allow you, the

viewer, to see an object as having depth and perspective.

Detail taken from a photograph of the Mona Lisa by Leonard da Vinci, showing the use of ‘Foreshortening’ in 2 dimensions.

Study the image of Leonardo’s ‘Mona Lisa’ above. It appears perfectly natural. But look at the arms closely; the right arm is distinctly shorter than the left.

Is this because the Mona Lisa had one arm shorter than the other? Or did Da Vinci make a mistake in his rendering of this 3D dimensional subject? Of course not. Da Vinci used ‘Foreshortening’ to create an illusion of a third dimension; a sense of depth.

This optical illusion has been employed by Da Vinci to illustrate to you, the viewer, that the Mona Lisa’s left arm is folded across her body while her right arm is placed coming forward, towards the viewer. By shortening the length of the right arm, the artist creates the illusion of the arm coming to the fore.

Foreshortening in art is something that we, as viewers, can all see and subconsciously ‘understand’ immediately. However, for an artist working in 2 dimensions on paper or canvas, foreshortening (as well as other techniques that create perspective) is a technique that can be difficult to apply and must be well thought out to create realistic depth in an image.

To quote the dictionary definition above, when an artist works in 2

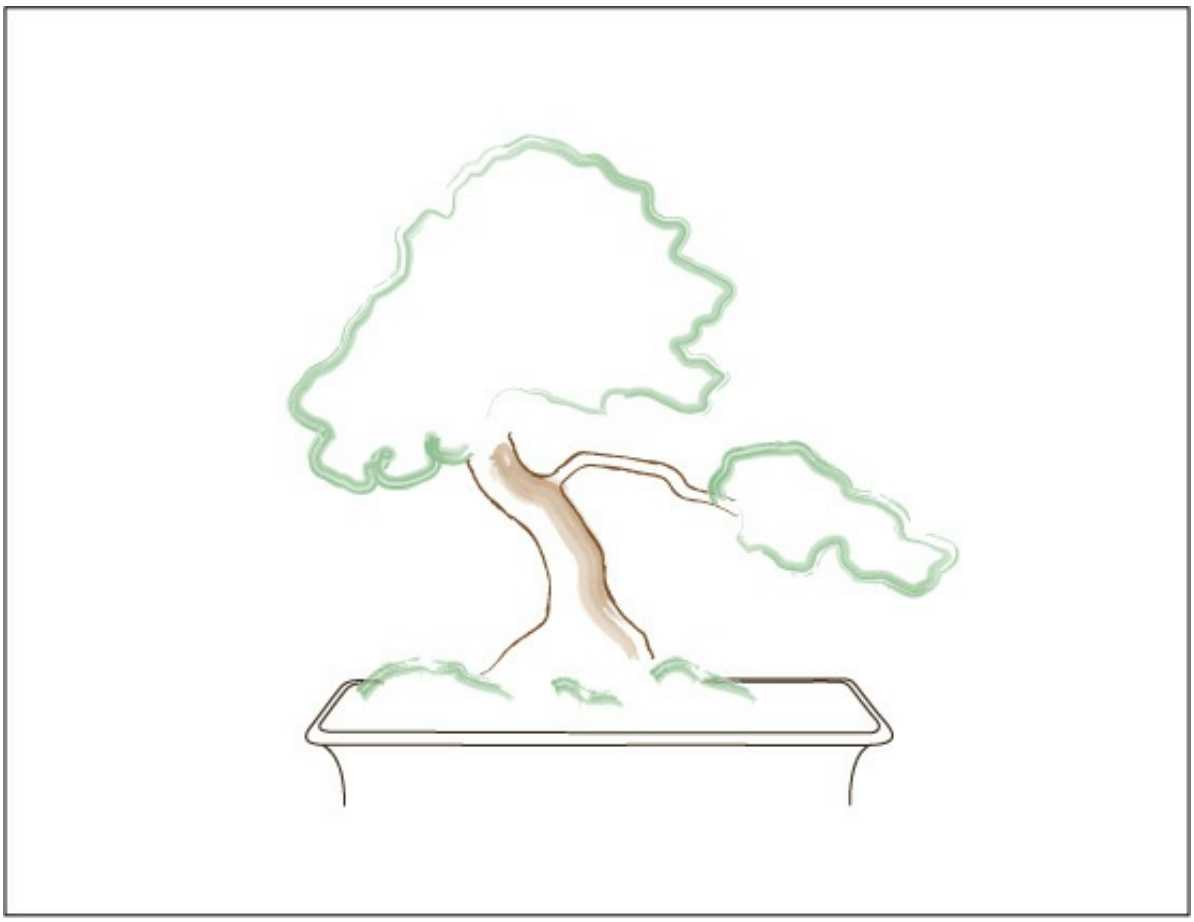
dimensional media, foreshortening is used “1. To shorten the lines of (an object) in a drawing or other representation so as to produce an illusion of projection or extension in space.”

The Use of Foreshortening in Bonsai

Bonsai is a 3-dimensional art form; a bonsai artist does not have the same problem of creating depth that the 2 dimensional artist does. However, a bonsai artist can still utilise foreshortening and use it to his advantage.

“2. To reduce the length of; curtail or abridge.”

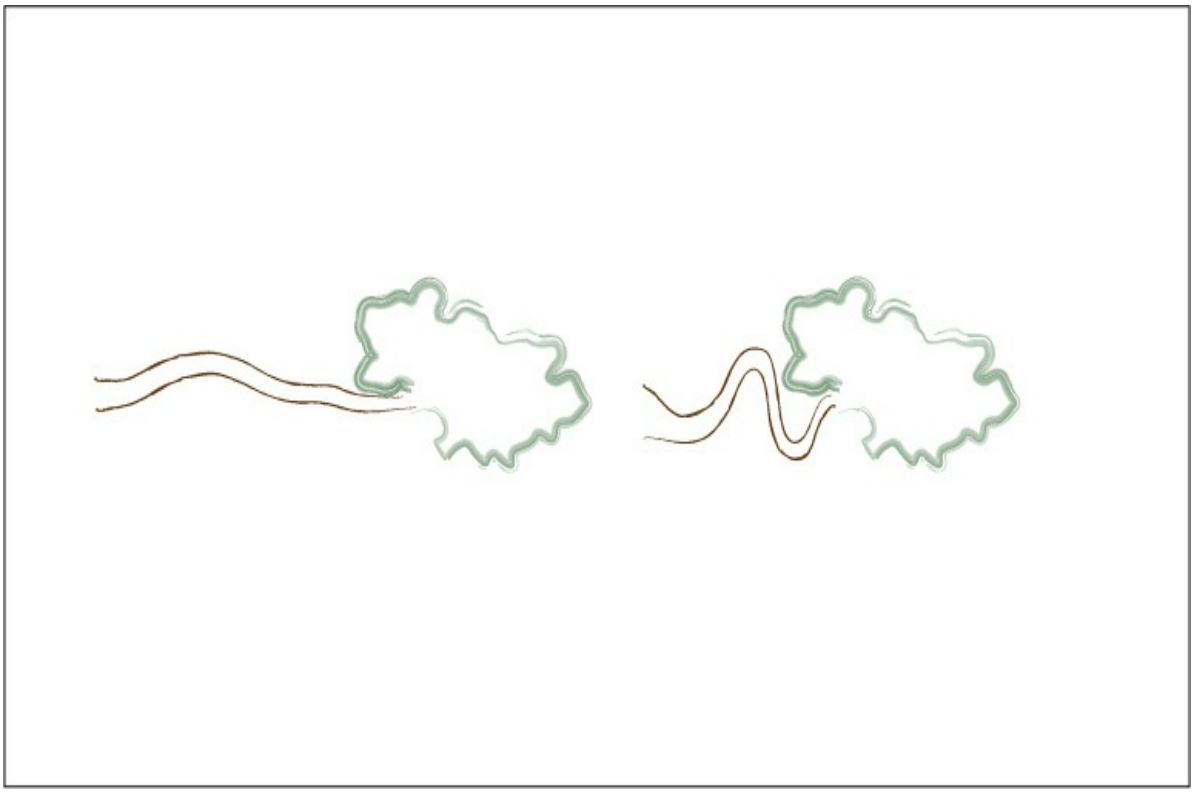
There are often situations when styling bonsai, where a branch or a trunk is too long and the foliage on the branch is too far away from the trunk; this is where the principles of foreshortening can be used to our advantage.



A Pine bonsai with a first branch that requires shortening.

The first branch of this Pine is bare apart from some foliage at its tip. Ideally the branch needs to be made shorter so that the foliage is closer to the trunk.

This is where we can employ the technique of foreshortening to our advantage. Rather than leaving the branch as it is and waiting for a number of years to try to create back budding (so that the branch can be shortened back) we can simply wire and foreshorten it. We create depth to shorten the length of the branch when seen from the front of the tree.



The first branch seen from above: on the left as it was, on the right, after foreshortening.

The long first branch is wired so that it has more depth; along its length it is placed so that it moves toward and away from the viewer. Much of the length of the branch is 'lost' as the branch line meanders towards and away from the front of the tree.

Now, when seen from the front view of the tree, the branch appears shorter and the foliage is closer to the trunk where the bonsai design requires it to be. Though the branch is exactly the same length is it was before but we have created an illusion of a shorter branch.

The Pine bonsai with its first branch foreshortened.

In this example of foreshortening the first branch of bonsai would seem quite obvious; however, it clearly illustrates the benefit of foreshortening. This principle of being able to visually shorten the length of a branch or shoot or even a trunk, can be used in many situations in bonsai, particularly when styling coniferous bonsai that fail to back bud easily such as Pine, Juniper or Spruce.

Always consider foreshortening when wiring and styling your trees. Can the apex or top section of the tree be reduced in height by foreshortening (tipping the top of the trunk forward, towards the viewer)? Can the foliage mass of a tree be made denser and tighter by foreshortening the secondary branches?

There are limitations of course. There is a point where excessive foreshortening of a branch (or branches) will look unnatural or even ridiculous. On the other hand, field-growing trees do have branches that meander backwards and forwards; a branch that grows straight outwards from the trunk without any depth is more unnatural and ugly. It is for you the bonsai artist to decide how far you can use this illusion!

The Pine bonsai with its first branch foreshortened.

With the tree simply turned 45º, the middle section of the trunk no longer looked too long and awkward and the movement of the entire tree was greatly increased, I now had a dynamic twisting and turning base on which to design the rest of the bonsai.

Examination of the deadwood at the base of the Juniper showed that it would need reshaping and refining. Whilst an improvement on its appearance in June 2009 when the tree was first obtained, the shape of the jin was ungainly and jarred with the movement of the rest of tree. From this new angle there were also several opposing or 'barred' jin which, as with opposing or barred branches, interrupts the eye as it travels from the base of the tree to the top.

October 2011: The Juniper turned 45º clockwise.

The deadwood at the base of the Juniper when seen from what I planned to be the new front.

The foliage of the San Jose Juniper, before being thinned out. Both needle and scale foliage can be seen growing together.

Juniper Foliage

Juniperus or Juniper species will display two types of foliage: juvenile, needle foliage and mature or adult, scale foliage.

Typically, the neat and tightly clustered scale foliage of a Juniper is seen as most desirable for bonsai and is preferred to needle foliage. Most Junipers are able to produce a mixture of both types of foliage in varying amounts according to the specific species and the type of growth phase (juvenile or mature) they are currently undergoing.

Close-up of the mature, scale foliage alongside the juvenile, needle foliage of the San Jose Juniper being styled in this chapter.

What is most important for us as bonsai enthusiasts is that a Juniper bonsai displays one type of foliage or the other only and does not carry a mixture of juvenile and mature foliage, as the contrast between the two types on one tree looks messy and untidy. Whilst scale foliage are most desired in bonsai, some juniper species such as the UK native Juniperus communis, J. squamata and the ever popular J.rigida have predominantly needle growth only (and for this reason are also known as 'Needle-Junipers'.

On Junipers that would normally carry mature foliage, needle foliage occurs when the tree is under stress or during strong and vigorous growth that can follow after heavy-pruning. Mature foliage returns after 1 to 2 years given a return to less stressful conditions and light but regular pruning of the foliage (in particular of the juvenile/needle growth).

When styling and wiring a Juniper bonsai it is necessary to thin out the foliage. The foliage mass needs to be reduced so that the actual structure of the tree, the trunkline, the primary and the secondary branches, can be seen clearly enough to arrange them into a refined foliage mass. The branches need to be cleaned of enough foliage to allow the wire to be applied.

Thinning the foliage also allows light into the foliage mass as a whole; allowing the tree to cultivate a dense mass of foliage shading the inner and

lower branches, severely weakening them.

As can be seen in the image above, this was a typical San Jose Juniper in that it had a mixture of the mature scale foliage and the less desirable juvenile needle foliage. Whilst the styling I was about to carry out was likely to cause a flush of juvenile foliage on the branches in the following year, the aim during the thinning out process was still to increase the ratio of mature foliage where possible by removing needle foliage at the expense of scale foliage.

‘Sports’ and ‘runts’ that have sprouted in the crutch of two older branches.

Thinning Out a Juniper to Prepare it for Wiring

Thinning out the foliage mass of a Juniper is not simply a case of randomly removing branches and leaves. There are several types of shoots and leaves that can be viewed as ‘undesirable’ within the foliage mass. A great deal of the process of thinning out a Juniper encompasses methodically working over the tree removing all growth that is undesirable.

Runts and ‘Hotheads’ or Sports

These are shoots that typically emerge from the crutch of two older branches. The runts will often just be a spray of foliage that will never extend into a shoot, whilst a sport or a hothead is an extremely vigorous shoot that will grow at a rapid rate compared to the neighbouring branches, it emerges between which. If allowed to extend as vigorously as they wish to, ‘hot-heads’ will dominate the surrounding shoots and branches, weakening them. Both runts and hotheads should be removed using a sharp pair of scissors. Note that leaving the very bottom part of the shoot intact can result in back budding from this point in the future.

The ‘runts’ and ‘hotheads’ removed. What remains are three branches at one intersection. One of these branches must be removed.

Reducing All Branch Junctions to Two Branches

All branches should bifurcate; that is, they should divide into two. Where there are more than two branches at a junction, the number should be reduced. Which of the surplus branches are to be removed is down to the enthusiast and depends on which branches he perceives will be the most useful to retain for styling. This can depend on factors such as the length of the branch, the amount of useful foliage it carries, the type of foliage it has (whether it is mature or juvenile) and whether the removal of a thicker branch will improve branch taper.

Thinning of the Foliage on the Remaining Branches

With the runts and hotheads removed and all branch intersections reduced to just two, the remaining shoots are then prepared ready for wiring and

laying out.

Two Juniper shoots cleaned and ready for wiring and laying out.

The remaining shoots all over the tree require removal of the foliage along their length leaving flattened ‘pads’ of foliage at their tips. It can be a difficult process to carry out when first applied as it runs contrary to what many enthusiasts first learn about pruning back Juniper foliage.

The tiny foliage mass at the tip of each shoot must be flattened into a lozenge-shape (when seen from the front) and this requires that all downward and upward-growing foliage is also pruned back.

.....and after thinning. Note the bare shoots with sprays of foliage at their tips.

Basic Tree Physiology:

Functions of the Trunk, Branches and Bark

The trunk and branches of a tree perform four functions. The first is simply to support the weight of the foliage. Secondly they extend the spread or reach of the foliage mass into new areas of light, gaining maximum possible exposure to the sun as well helping the tree compete with its neighbouring tree for light.

Thirdly, along with the root system, the trunk and branches are able to store nutrients during both the growing season and during dormancy, enabling the tree to have energy reserves ready for when they are required.

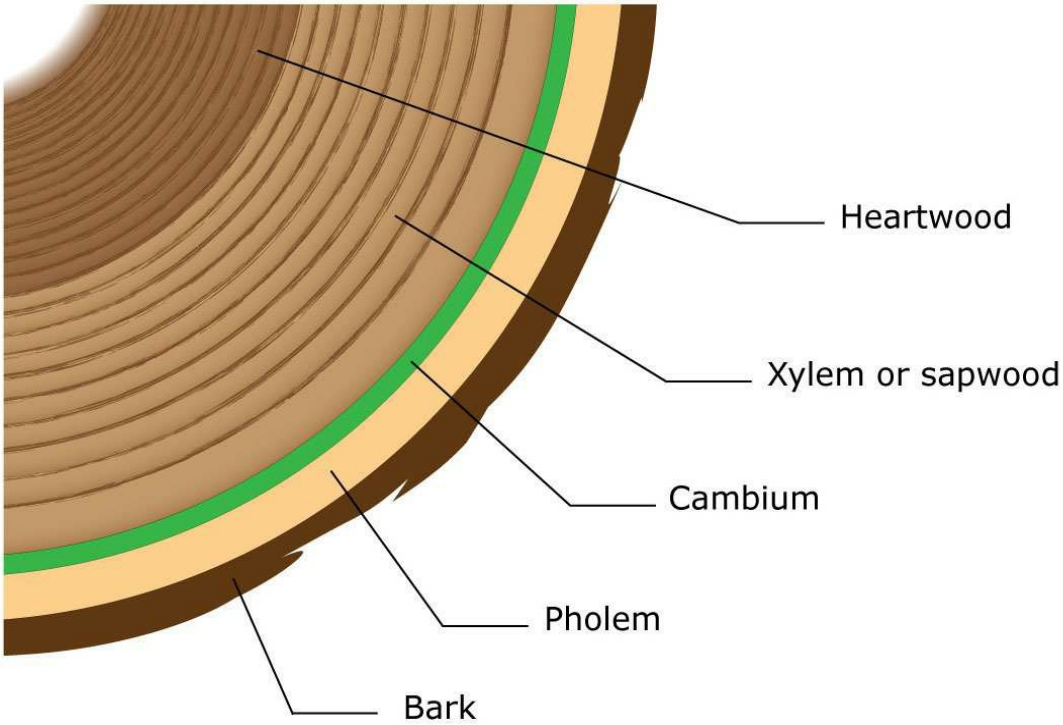
Their last primary function is to provide a conduit for water and nutrients from one part of the tree to another.

Large amounts of water are transpired by a tree on a daily basis. Water is

absorbed by the root system and is supplied to the leaves via the trunk and branch system. The vessel within the trunk up which the water travels is known as the xylem and this lies just below the cambium layer (the thin layer of green seen directly under the bark).

The xylem is formed by cells that elongate as they grow. These not only thicken their sides with lignin but ultimately break down their dividing walls where they meet tip-to-tip, so that together they form long continuous tubes through which water is able to enter.

That done, the cells die. The pipes that are created are then inert and dead but are also full of water. As the cells in a leaf lose water by evaporation, it is replaced by water from the top of the tubes and the whole water column is pulled upwards. This puts an enormous strain on the sides of the tubes within tall trees, but their woody walls are rigid enough to withstand it.



Cross-sectional Diagram of a Tree-trunk or Branch.

Every season, the xylem which contains the water vessels is replaced by a new layer. This annual replacement of the xylem creates the familiar growth rings by which a tree can be aged. The old xylem then becomes part of the

heartwood of the tree. The heartwood is essentially dead ‘waste’ material, but it acts in a structural capacity for the tree, gradually widening year on year as the tree becomes taller.

The cambium layer lies outside the xylem and this is the most important part of a tree, responsible for controlling growth. It is a single cell layer just beneath the bark and appears green when the bark is scraped away in most woody plant species. The cambium layer is responsible for producing new roots and new shoots as well as tissue that heals over wounds.

Outside the cambium layer is the phloem. This is responsible for distributing the sugars produced in the leaves back down to other parts of the tree. This is also replaced every year and the build up of old phloem layers forms the thick corky bark that can be seen on old trees. The older the tree, the thicker the layer of bark or dead phloem is. The dead layers of old phloem are not very elastic and, as the live areas of the trunk continue to expand, the bark starts to split into long fissures and plates.

Cross-sectional image of an English Elm showing the bark and phloem,

the cambium layer, the xylem and then the heartwood. The heartwood shows the old layers of wood that are now dead and simply part of the structure of the tree.

Life-Lines or Live-Veins in Junipers

As with most other coniferous species and certain broadleaf trees, Junipers have very distinct life-lines. This is an important concept to understand when working with these species.

Stated in basic terms; each shoot on a Juniper has a distinct relationship to its own root in the soil. Each shoot is literally directly connected to its root via 'life-lines' that run from the shoot, back through the branch system, down the trunk and into the soil where its root lies.

Both the root and the shoot support each other in a free exchange of gases, nutrients and water. If the root dies or is removed, the shoot with which it is directly linked and their life-line also dies. And vice-versa, if a shoot dies or is removed, its life-line down the trunk and its related root will also die.

The bark of Juniper trunk or branch can be considered to consist of a huge number of life-lines or life-veins, all lying together around the wood but working independently of each other.

This wild Juniperus communis or Common Juniper, photographed in the hills near my home, has a trunk that displays the effect of life-lines and directly-linked growth strikingly. Where branches in the foliage mass have died, their live-veins have died, leaving long-strips of deadwood we know in bonsai as ‘shari’.

Where the foliage has continued to grow, the life-lines supplying it have continued to grow and swell over the years resulting in very pronounced live-veins.

Understanding live-veins, how they work and how to take advantage of them is key to Juniper styling and allows greater manipulation of the tree into a desirable bonsai, as the reader will see through this Chapter.

At the back of the tree there were two branches that emerged from the trunk together. While ordinarily I would consider removing one of them, both were necessary for my design. The left-hand branch wound around the front of the trunk and supplied foliage for the ‘first’ branch while the right-hand branch was the only source of foliage for the lower part of the back of the tree. One advantage I had was that the point where both branches emerged from the trunk was hidden from the front of the tree and was therefore unobtrusive to the eye.

The back of the trunk has two thick branches that emerge from the trunk together.

To separate the two branches a little and move the right-hand branch so it could supply foliage to the back of the tree, I decided I would need to split the branch in half lengthways, keeping the foliage on the right of the branch and removing the foliage on the left. Splitting the branch would enable me to bend the branch easily and add more movement to it.

Removal of the foliage from the left-hand side of the right-hand branch.

Knowing that the foliage on the left-hand side of the branch to be split would not be used, it was removed.

Unless pronounced live-veins or shari are visible, it is almost impossible to tell exactly where they lie, however, it is possible to make an educated guess as to where they will not be lying.

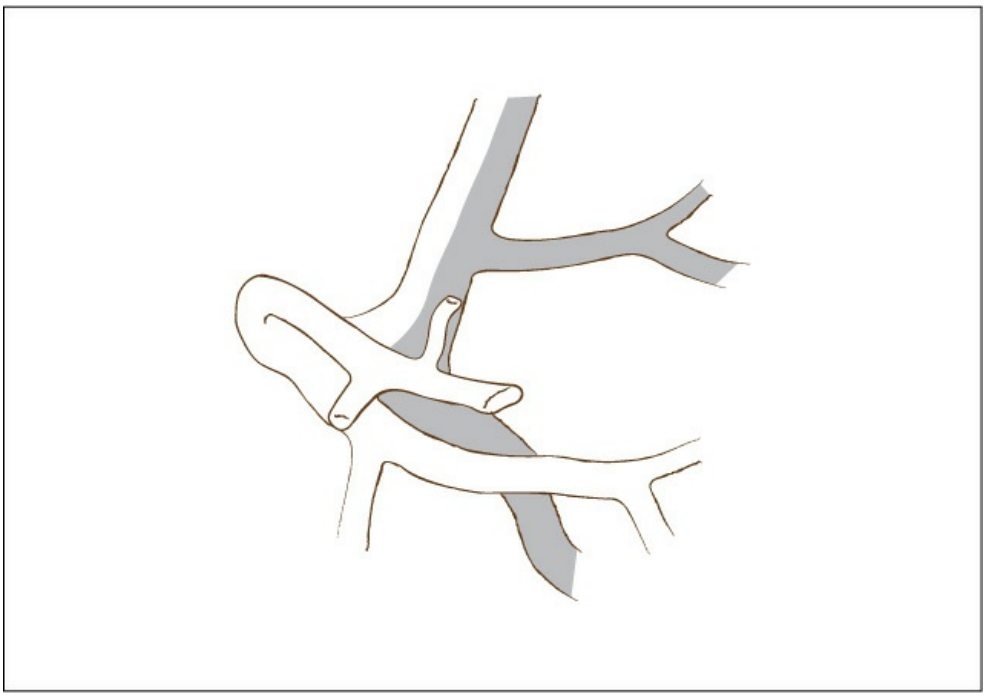


Diagram of the branch that will need splitting. The right-hand side of the primary branch (marked in grey) will be kept while the left-hand side will be removed to allow the branch to be bent more easily. Whilst not knowing exactly where the live-veins are on this branch, it is safe to assume that the right-hand side of the primary branch carries the right-hand branches. These branches will be unaffected by the removal of the left-hand side of the primary branch. However, the branches emerging from the left-hand side of the primary branch will die when the primary is split.

With the thinning out of the foliage nearly finished, the structure of the tree is now visible and ready to be wired.

Cleaning Juniper Bark

Once I had finished thinning out the foliage mass, my final job for the day was to clean the bark by removing the aged, mature layers to reveal the red of the new bark lying underneath. This is not an essential task and is one that some enthusiasts prefer not to carry out on their trees. My view is that it is down to personal preferences. It is, however, very useful for discovering exactly where the live veins and the natural deadwood or shari lie along the trunk and primary branches.

Using a brass wire brush to clean the outer layer of the bark.

The very thin outer layer of old bark is very carefully brushed away using a brass brush. Do not use steel as it is too harsh and will cut through the juvenile layer.

Slowly removing the outer layer of bark to reveal the red bark underneath.

The section just above the elbow in the trunk. It is just possible to see two raised life-lines either side of a natural shari.

As the old bark is slowly and carefully removed, the red layer of the life-lines and the shari become very apparent.

At the end of the first session the foliage has been thinned out and the bark cleaned.

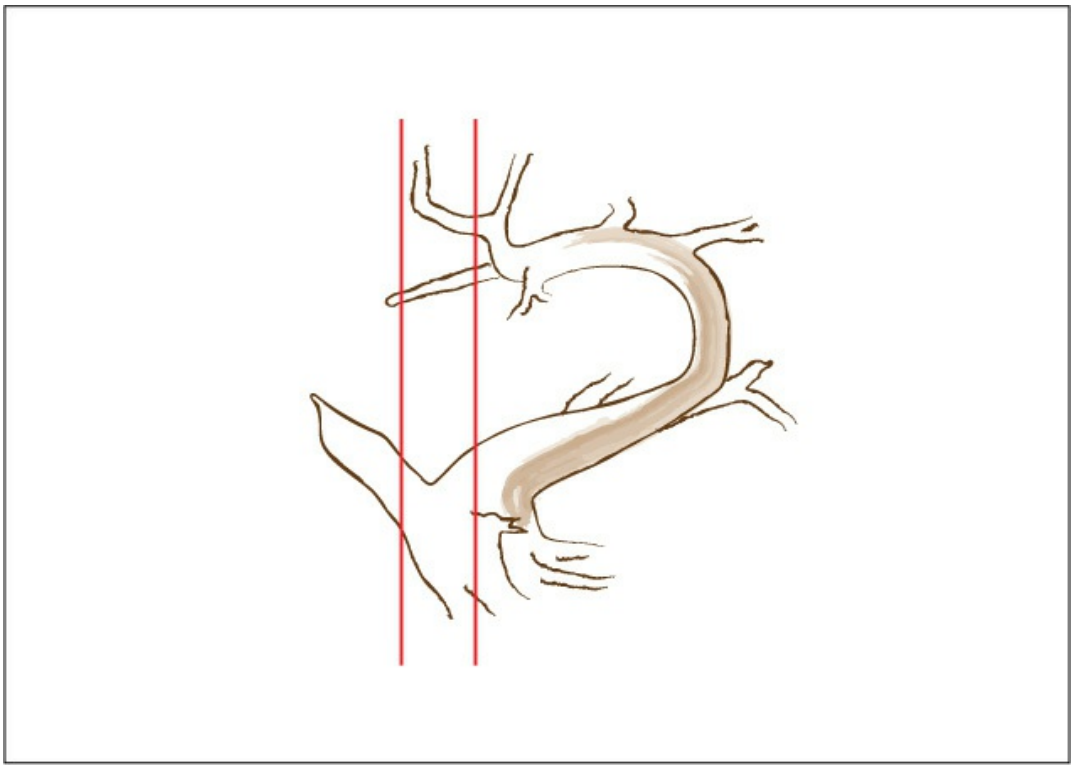
By the end of the first session of work on the Juniper, the foliage has been fully thinned out and is ready for wiring and arranging. The bark has been cleaned, revealing the natural deadwood and some of the life-lines on the trunk.

The tree at the beginning of the second styling session.

A week later I had the time to carry out a second styling session on the San Jose. My next priority would be to clean up the base of the tree, where there were raised surface roots from where the planting angle of the tree had been changed from a cascade.

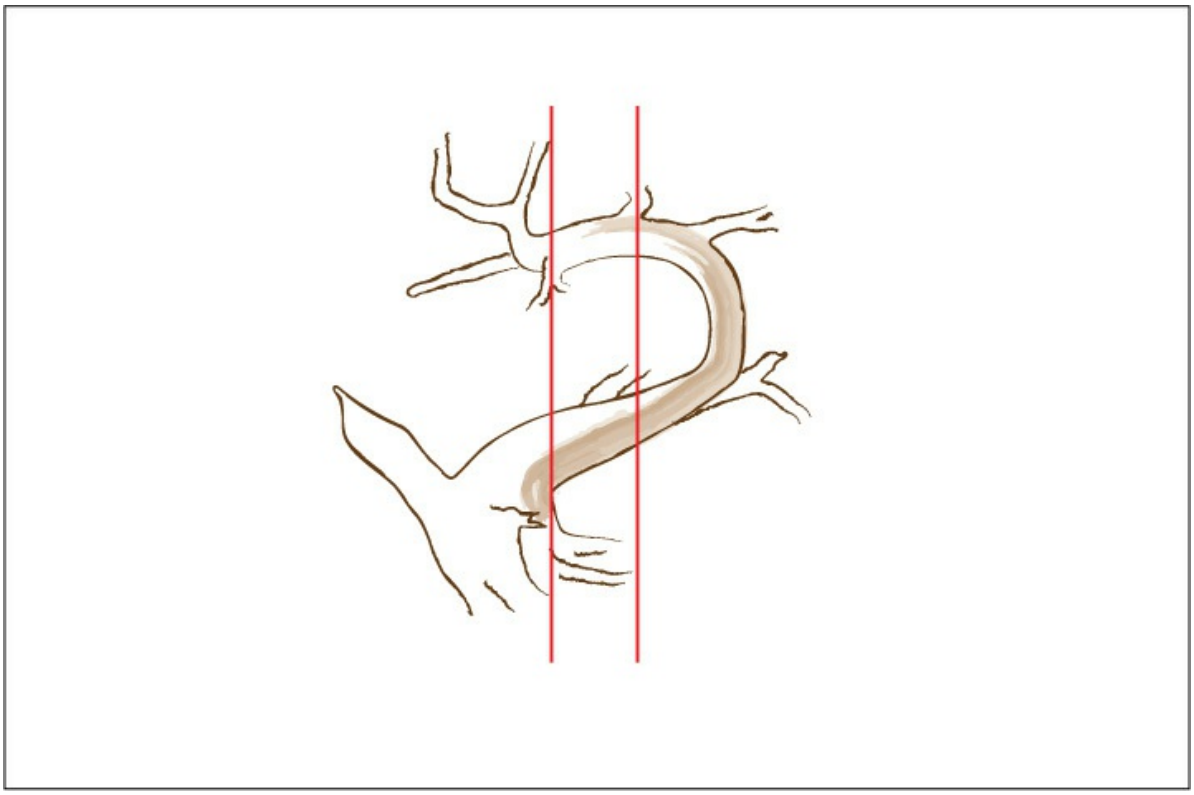
The Juniper from my new preferred front view with the top of the trunk jinned.

Seen from the new front view the Juniper was starting to take shape. With the trunkline now visible it was possible to see that the ‘elbow’ in the trunk where the trunk comes back on itself was too rounded and would need to be made more dramatic by lowering it. It was also possible to see that the ‘top’ or the ‘end’ of the trunk was a little too long and, therefore, the foliage on the uppermost branches was removed and the remainder stripped of its bark ready to be shaped as jin.

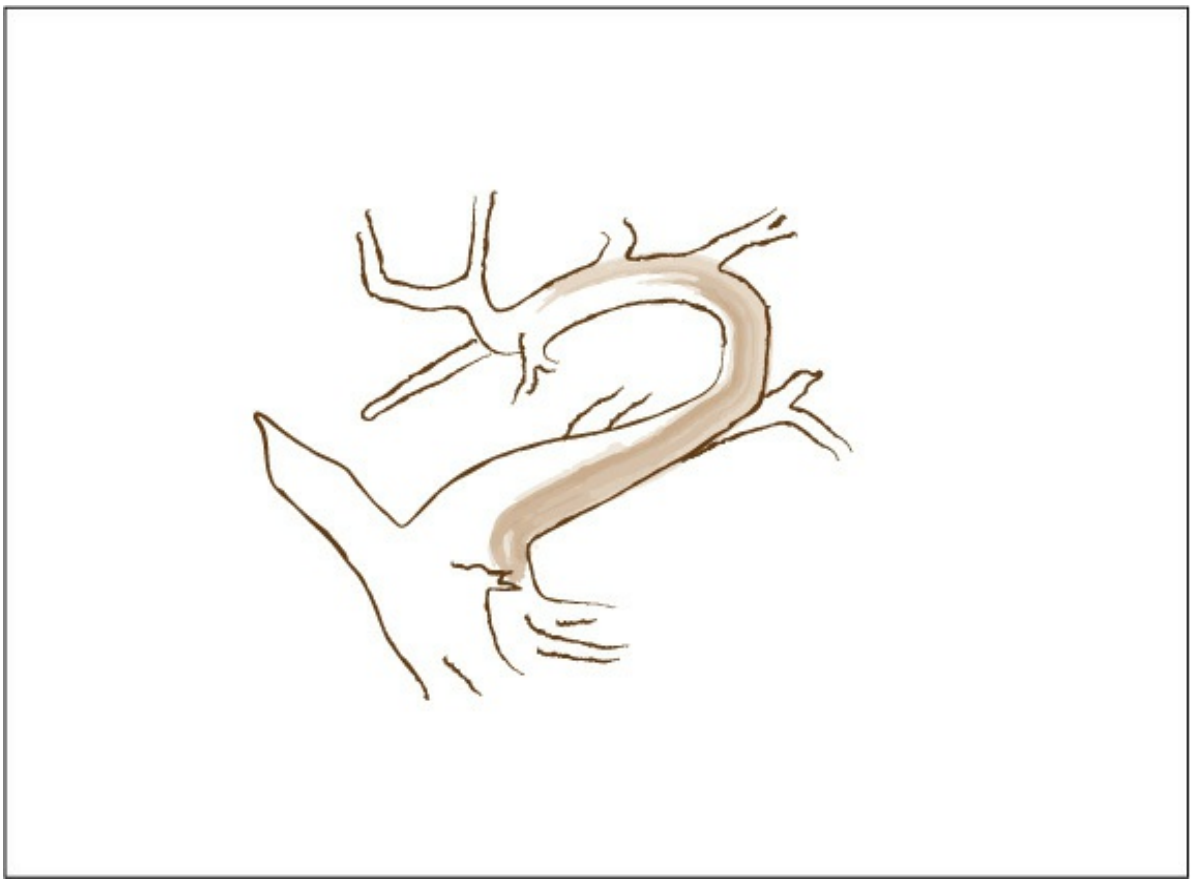


Line-drawing of the trunk and primary branches of the San Jose before I jinned the trunk. With live branches retained at the very tip of the trunk, the apex and the left-hand extreme of the foliage mass would have been to the left of the trunk-base, invoking a feeling of instability in the tree.

The apex, however complex or convoluted its trunk is, should always be placed directly above the base of the trunk. This creates an almost subconscious feeling of stability to the viewer of the tree.



The ideal apex for the tree is directly above the base and, after removal of the foliage from the branches at the very top (or end) of the trunk, I will be able to place the apex correctly.



With the angle of the ‘elbow’ in the trunk reduced, the trunkline becomes more dramatic as well as compressing the foliage from the surrounding branches together into cohesive foliage mass.

Cleaning and Arranging the Surface Roots

When the planting angle of the Juniper had been changed in 2009 from a cascade into an informal upright, the roots on the right-hand side of the tree had lifted above the soil surface, resulting in an ugly raised mass of soil and roots at the base of the tree.

To improve its appearance, I decided to try and clean out the original ground soil that was still within the area immediately below the trunk-base, remove any roots that might be dead or bend downwards any that weren't and, finally, lower the overall height of the soil surface.

Removing the ground soil from the surface roots.

Using a wooden chopstick to avoid causing too much damage to the delicate roots, I started to carefully remove the soil. Juniper cannot be bare-rooted nor have the entire soil mass changed in one year; however, cleaning all the soil from just the surface roots would cause no problems, particularly as the majority of the roots concerned had no fine feeding rootlets at soil level itself.

Dead root growing from the front of the tree.

As I cleaned away the soil around the thicker surface roots, it became apparent that a number had died, possibly as a result of being lifted clear of the soil and drying out, or, the roots' connected branch being removed or jinned.

Another dead Surface root.

Each root that I ascertained to be dead was shortened back and the bark peeled to be made into a root-jin. Root-jins are a feature that can be used to enhance the trunk-base of a Juniper bonsai and increases interest at soil level.

The area of the trunk-base and surface roots after further work. Another 2 dead roots had been exposed.

Slowly but surely the surface roots and the whole area that is raised above the rim of the pot was uncovered using just the wooden chopstick.

...and the dead roots pruned back ready to make root-jin.

One of the live surface roots that had rooted downwards into the soil.

As I cleaned further down into the surface roots, I began to discover live roots that had (at some point) successfully rooted downward into the main part of the soil mass. These live roots were left unpruned and undisturbed as far as possible.

A mass of live and dead roots at the front of the nebari.

After cleaning the roots with water, it became obvious that at this stage I would not be able to remove or lower the entire raised soil surface.

Once I had cleaned away as much as possible of the old soil around the surface of the rootball I gently washed the roots to clear away the dirt and allow me to have a final inspection of which roots to keep (because they were still alive and supporting the tree) and which roots could be removed or shortened back as they were dead and raising the height of the surface roots unnecessarily.

Note that, as mentioned already, never bare-root and wash the entire rootball of a Juniper as doing so will kill or seriously affect the health of the tree.

The soil surface after infilling around the remaining live roots with fired clay and sphagnum moss.

Once I had removed as much of the height of the soil surface as possible, 3 heavy-gauge lengths of wire were threaded through the drainage holes at the base of the pot, looped over the surface roots, and then used to pull down the surface roots as far as I possibly could without damaging them. The area was then in-filled with my preferred bonsai soil (high-fired clay) and a little sphagnum moss before being watered in.

In future years the tree will require further work on this area at each repotting, until the tree is sat lower in the pot and a satisfactory soil level has been achieved.

View of the back-branch that needed to be split, as seen from the back of the tree.

Splitting and Moving the Back Branch

As discussed previously in this Chapter, one of the two back-branches needed to be split lengthways so that I would be able to separate it from its neighbour and add movement along its length.

Branch splitters with a wide mouth enabling them to cut through the branch without crushing it.

Using the branch splitters to split the branch in half lengthways.

The branch splitters cutting cleanly through the centre of the branch, splitting it in half. Starting at the top of the branch, I used the splitters to carefully work my way down to the bottom of the branch, splitting it along its entire length.

The branch after splitting. Note the proximity of the other branch to the left and below it.

The split branch as seen from above.

With the branch split in half lengthways, it would be much easier to move it away from its neighbouring branch and introduce some bends and movement to the otherwise straight section of wood. The live veins supporting the remaining secondary branches remained untouched, intact, and the foliage was still in place for me to use a part of the foliage mass. The scar along the branch would always remain visible as it was too big to ever callous over. With some embellishment of the deadwood in the future, however, once the branch itself has set into position, the appearance of the wound can be made to look like a shari feature.

A groove carved into the split branch ready to accept a length of 5mm wire.

With the branch now thinner and, therefore, more easily manipulated it was prepared ready to be bent. First of all, a groove, wide and deep enough to accept a length of heavy-gauge wire, was made using a Dremel.

The 5mm wire inserted into a pre-drilled hole at the base of the branch.

A hole was drilled into the base of the branch so that the heavy-gauge wire could be inserted, anchoring it into position before being laid into the groove along the branch.

With the heavy-gauge wire in place, the entire branch was wrapped tightly with black electrician's tape.

With the heavy-gauge wire in place, the entire branch was wrapped tightly with black electrician's tape. Whilst the wire placed along the groove would not be sufficient to hold the new shape of the branch once it was bent, it would certainly help. Not only did the electrical tape hold the wire into position, it was also there to support the bark and the branch itself as it was bent, guarding against possible breakage.

Note that the electrician's tape is wound sticky-side out at first to stop the tape sticking to the bark itself. Once a layer of tape covered the length of the branch, the tape was wound, very tightly, sticky side in until there were 5 or 6

layers.

Beginning to bend the branch after applying a coil of 5mm aluminium wire.

A coil of 5mm aluminium wire was then applied to the branch, over the tape, and the branch was ready to be bent.

Slowly the branch was bent away from its neighbour and towards the back of the tree.

With the preparation I had carried out, the back branch bent easily. Using both hands to securely hold each section that required bending, with particular attention to supporting the outside of a new bend where it was most likely to crack, I moved the branch away from its neighbour and towards the back of the tree. Having accomplished this, I then added movement to the branch itself so it was no longer perfectly straight.

With the back branch safely into position, it was time for me to reduce the size of the elbow in the trunk.

When bending rigid or thick branches that require a lot of force to manipulate them, always ‘ease’ the branch slowly into position and listen out for the sound of the wood cracking. When the wood inside the branch is pushed beyond its natural elasticity, it will often abruptly break, producing an audible ‘cracking’ noise.

This in itself does not immediately signal the death of the branch or the foliage it supplies. However, once the wood has split, it is only the relatively weak bark and cambium layers that physically support the weight of the branch and its foliage. Any further bending of the branch in this area will inevitably cause the cambium to tear, causing the branch to die.

One of the purposes of wrapping a thick branch with black tape or raffia is to protect the bark and cambium layers in the event of the wood cracking and they will provide a degree of protection against this happening.

In the image on the previous page, the cracked wood of a Juniper branch that was wired and bent heavily 3 years previously can be clearly seen. The cambium surrounding the crack has now calloused well and the foliage of the branch is healthy. However, until more layers of new wood have been laid down to strengthen the area; this will remain a structurally weak part of the branch.

The Juniper after bending the back branches, now ready for me to reduce the size of the elbow in the trunk where it turned back on itself.

As discussed previously in this chapter, I wasn't happy with the shape of the middle section of the trunk or the 'elbow'. The gently rounded shape of the elbow clashed with the otherwise masculine appearance of the tree. Compressing the top half of the trunk downwards, by sharpening the angle of the elbow, would also mean that the upper foliage was lower and closer to the bottom branches, encouraging a more cohesive foliage mass.

With a piece of timber of 7-8cm in diameter, the trunk was too thick to simply coil wire around and bend. As with the split back-branch, the structure (or the wood) of the elbow needed to be weakened so it would bend more easily.

Fortunately for me, as has already been illustrated, while cleaning the bark on the trunk, I had uncovered a natural shari on the outside bend of the elbow.

With the branch split in half lengthways it would be much easier to move

it away from its neighbouring branch and introduce some bends and movement to the otherwise straight section of wood. The live veins supporting the remaining secondary branches remained untouched, intact, and the foliage was still in place for me to use a part of the foliage mass. The scar along the branch would always remain visible as it was too big to ever callous over. However, with some embellishment of the deadwood in the future, once the branch itself has set into position, the appearance of the wound can be made to look like a shari feature.

Looking down onto the shari on the outside of the elbow in the trunk.

To weaken the structure of the trunk at the elbow I would need to remove a large amount of wood from inside the bend. This shari would allow me to use a carving bit attached to a Dremel and carve out the heartwood of the bend without damaging the live-veins of the trunk itself.

Carving out the heartwood inside the trunk elbow.

I proceeded to push the carving bit straight into the interior wood of elbow and remove as much material as possible. Great care had to be taken that the carving bit did not go all the way through the trunk and out the other side.....

The hollowed out trunk section.

Once the bulk of the wood inside the elbow section had been removed, I began to test the flexibility of the upper trunk itself. Unfortunately, a very large percentage (80% or more) of the heartwood needs to be removed before the trunk starts to become flexible. It was however necessary to ensure that there was still enough wood remaining to support the weight of the upper trunk and foliage! Regular checking and rechecking of the flexibility of the elbow ensured that I removed the correct amount of wood.

The hollowed out trunk section beginning to bend the upper trunk downwards, seen from the proposed front view of the tree.

Unsure of how the now-hollowed trunk elbow would react when the upper trunk was bent downwards, I slowly began by bending it downwards a few centimetres at a time, each time securing the new tighter curve I achieved with a guy-wire.

The hollowed out elbow tightly bound with electrician's tape.

Once I had established that the elbow was bending as expected and the 'walls' of the trunk were not buckling and would tolerate further movement, I wrapped the elbow very tightly with electrician's tape. As with the split back-branch, the tape secured the bark firmly against the wood and reduced the risk of tearing or snapping the wood.

Over the course of the next couple of days I continued bending the upper trunk downwards slowly but surely, pausing between each bend to allow the live veins and internal wood of the trunk to adjust before being bent again.

Arranging the Foliage Mass

With the bending of the trunk and back-branch complete, all that remained for me to do was to wire and arrange or 'lay-out' the foliage mass and to refine the deadwood. On many occasions while styling coniferous bonsai, there are practical reasons for refining the deadwood features before laying out the foliage, principally because it is easier to work on the deadwood with power tools and, in particular, blow-torches prior to carefully

arranging the foliage mass. This is not always essential and the positions of the deadwood areas on this particular tree meant that I could arrange the foliage first.

As has already been described in this chapter, during the process of thinning out the foliage I had created a large number of secondary and tertiary branches that each carried a small pad of foliage at its tip. Each foliage-carrying branch needed to be wired and its pad then positioned so that it became part of a much larger mass of pads.

A secondary branch consisting of 7 tertiary branches, each carrying a pad of foliage, fanned out to create one large foliage pad.

The same 7 tertiary branches consisting of 7 small pads of foliage fanned out together, seen from the front. These branchlets have created a larger foliage pad or ‘cloud’.

Another foliage mass seen from above, this time consisting of 5 tertiary branches.

A second layer of 3 tertiary foliage pads is laid out on top of the first.

The two layers of laid-out foliage pads as seen from the front.

As each part of the tertiary foliage is pruned and its tips pinched out over the coming years, it will become denser and be allowed to almost merge with its neighbours, creating an attractive mass of green foliage.

Laying out the branches.

The San Jose seen from the back after laying out all but the branches in the apex.

I started the third and final day of styling the Juniper by slowly laying out the branches.

Always start with the lowest or first branch as this dictates the shape and style of the foliage mass as a whole. First the primary branch was wired and placed, followed by its secondary branches and then their tertiary branches, before beginning to work on the next primary branch up on the trunk. This process continues, always working upwards towards the crown until the entire foliage mass has been laid out.

The San Jose after laying out all but the apex branches, seen from the front-view. At this stage, with the deadwood yet to be worked on, the foliage was not placed together as tightly as it would be when the styling was complete.

After nearly 6 hours of wiring and laying out the foliage mass.

After nearly 6 hours of wiring and laying out each and every branch on the tree, the foliage had finally been arranged and the tree was really beginning to take shape. This part of designing and styling a Juniper is a time-consuming process but is also essential if the bonsai is to have distinct shape and form and not simply be a shapeless mass of foliage.

The foliage mass seen from above after laying out had been completed.

When observed from above, the foliage mass of the Juniper further explains how the individual foliage pads are laid out; each having its own light and space in the canopy in which to grow.

Styling the Top Jin

Observant readers will have noticed that the jin at the top of the trunk that had been created earlier in the styling process was shaped during the laying out of the foliage.

Top jin when it had been initially created before the foliage had been laid out. The foliage and then the bark had been stripped away leaving just the bare-wood remaining.

Jin, or deadwood branches, are created by removing the foliage from a branch, ‘pruning’ the branch back and then removing the bark. But rarely is it enough to simply then bleach the wood with lime-sulphur. Design-wise, jin should then be styled with the same basic rules being applied as one does with living branches. That is, they should not be barred (have a live branch or another jin opposing them on the opposite side of the trunk), have taper, and they should have movement and not be unnaturally straight.

As can be seen in the image above, with the jin that I created from the top branches of the Juniper, rather than creating short ‘stubs’ from the base of the primary branch itself, utilise the secondary branches.

The result is a far more convincing imitation of a live branch that has simply died and become weathered and aged.

The top jin before bending, seen from the reverse side. Notice how I retained the secondary and tertiary branches as well as the primary branch to help create taper in the jin and to utilise the natural movement of the dead branch.

Jin can be manipulated using heat so that they appear to ‘flow’ with the movement of the trunk and the tree itself. When a jin has been newly created, it still contains sap that, when heated, makes the wood pliable. If the wood is manipulated into a new position while still hot and then held into its new position while it cools down, it will permanently keep that new orientation.

After heating the two jin (notice the burn marks where the gas torch has been used), I have held the jin in their new positions using bonsai wire while they cool down.

After using sheets of house-hold tin foil to protect the surrounding foliage from the heat, I used an ordinary plumbers' propane gas torch to warm the jin. A great deal of heat is required to warm the sap inside the wood sufficiently to make it pliable. It is necessary to keep burning the wood until it starts to scorch and possibly even catch alight. Once hot enough, the wood will suddenly become very supple and easily manipulated.

In the above image, notice the burn marks where heat from the gas torch has been applied. I have held the jin into my desired positions using bonsai wire. After a few minutes, the sap inside the jin cools down and the wood holds its new position.

The jin after cleaning the scorch marks with a steel wire brush.

Once the wood had cooled down and I was happy with the new position of the jin, the burn marks were cleaned with a steel wire brush, ready for bleaching with lime-sulphur.

The amount of sap in the wood of newly created Jin slowly decreases with time. Within 3 months to a year (dependent on how thick the jin is) the wood dries out and cannot simply be heated in the way illustrated here. I prefer to shape jin immediately after their creation for this reason; however, there are techniques for bending dry-wood using water. Wrapping a dried-out jin with a wet towel for 2 to 3 days will allow enough moisture to permeate the wood which can then be heated and manipulated as described above. I have found, however, that the wood is less pliable and prone to snapping in comparison to fresh, sappy, wood.

Creating Deadwood on Coniferous Trees by Hand

Peeling away slivers of wood on coniferous species such as Pine and Juniper takes advantage of the fibrous nature of their wood. It creates more random and less contrived deadwood as the splinters are torn away from the

wood grain, swerving to avoid knots and other jin as they come away.

Once the slivers have been pulled away from the tip of the deadwood, the resulting jin is given texture and character that cannot be recreated as convincingly by machine tools such as a Dremel or a die-grinder.

A further advantage to hand-carving is that, as the freshly created deadwood dries out, it naturally cracks along the grain. Wood that has been carved by machine can begin to look strange as the wood dries and splits across any grain or texture that has been imposed by machine.

Splitting the end of the straight jin with the branch splitters.

Below the newly shaped jin was an old jin that had been created by a previous owner of the tree. While I had no wish to alter the shape of this particular jin, I did want to improve its appearance and create better surface texture as well as taper, so I began to split the wood and peel back the fibres.

After splitting the end of the jin.

The tip of the jin was split using some branch splitters although any tool such as a gouge or knob-cutter can be used to split the wood, or the tip of the jin can be crushed with some jin-pliers to create distended fibres that can then be peeled.

Peeling back the split-ends of the jin.

Using a pair of jin-pliers, the split ends of the jin were peeled back. If the slivers of wood peel back further than is intended or threaten to damage the bark surrounding the jin, simply use some knob-cutters to cut through the base of the splinter.

Taper and texture has been created by splitting and peeling the end of the jin.

I continued to work over the entire area, carefully removing fibres until I was happy not just with its shape but its appearance.

The smooth surface of the top jin ready to be aged (although not necessary to the process, I had given the jin a coat of lime-sulphur since bending it).

The rounded and smooth surface of the newly bent top jin gave it a juvenile and artificial appearance, so this too was peeled.

Part of the surface of the top jin after peeling back the fibres.

Again, I began to peel back thin layers of wood and individual fibres to create a grain on the surface of the jin.

The jin after cleaning the scorch marks with a steel wire brush.

Once the wood had cooled down and I was happy with the new position of the jin, the burn marks were cleaned with a steel wire brush, ready for bleaching with lime-sulphur.

After burning away the tool marks and fluff.

Once I was happy with the appearance of the newly created texture and grain I used a small gas torch to burn away the tool marks and debris.

After cleaning the wood with a wire brush.

Finally, the burn marks were cleaned from the wood with a steel-wire brush and all that remained to do was to bleach the wood with lime-sulphur.

The top jin after several coats of lime-sulphur were applied to whiten them.

Lime Sulphur

Lime sulphur is well known by bonsai enthusiasts as a foul-smelling liquid that is brushed onto deadwood in order to produce a distinctive white colour. It does not paint the wood white; rather, as the lime sulphur dries, it ‘bleaches’ or ‘stains’ the wood the familiar chalky white colour.

Lime sulphur was originally developed as a commercial winter wash (fungicide and insecticide) by wine-producers and used to spray trees during the Winter to kill any residual moulds, fungi and overwintering insects or eggs. It was first developed during the mid 19th century to control mildews on grapevines in French vineyards. From the early 1900’s to the 1940’s, lime sulphur was used widely and produced on a commercial basis until it was superseded by newer, more efficient, chemicals.

How Lime Sulphur Bleaches Deadwood on Bonsai

The lime sulphur mixture produces a certain amount of sulphur dioxide (SO2) as it dries, dependent on the ambient temperature, the warmer the lime sulphur solution is as it dries, the greater the volume of sulphur dioxide that is

produced).

Sulphur dioxide (SO2) is a known preservative still used in the wine-making and dried-fruits industries, where it is used for its ability to kill microbes and bacteria. Sulphur dioxide is also known as a reductant; that is, in the presence of water, it is able to 'decolourise'/remove the colours of permeable materials that it comes into contact with. Sulphur Dioxide is still used in some industries to bleach paper and delicate fabrics such as clothes.

The bleaching effect of sulphur dioxide is not permanent, however. After exposure to oxygen (in the air), the bleached material is slowly oxidised and the natural, original colour or pigment of the stained material returns.

This is one of the reasons why lime sulphur must be repeatedly applied to the deadwood of bonsai to ensure it stays white.

Where Do You Obtain Lime Sulphur?

Lime sulphur is virtually impossible to obtain at general horticultural outlets as it has long been superseded by other insecticides, fungicides, and winter washes. These days, the only place you will find lime sulphur liquid is at Bonsai nurseries or online through Bonsai mail order companies. It is a relatively cheap product and a small bottle will last a long time.

I have only ever seen one authoritative guide to producing your own lime sulphur; this involves boiling calcium hydroxide and sulphur and allowing it to simmer for a few hours. Given the cost of obtaining the ingredients, the danger of this process and the fact that it is extremely smelly, it is not worth trying to produce your own lime sulphur!

Materials Required For Applying Lime Sulphur to Bonsai Deadwood

Together with your lime sulphur, you will require a separate dish. Pour a small amount of the lime sulphur solution into the dish or container. Do not apply the lime sulphur directly from the bottle as it will spoil the mixture.

Lime-sulphur isn't a pleasant liquid. Without doubt it should be treated with respect. If you swallow any solution or get any in your eyes, seek medical assistance.

Lime sulphur will stain almost anything that it comes into contact with, so it is necessary to use a covered or old surface to work on.

You must work outside. Lime sulphur is very pungent until it dries, so do

not apply it indoors!

Use a paintbrush to apply the lime sulphur to the deadwood. The exact size of brush you require will depend on the size and intricacy of the deadwood it is being applied to, but generally an old paintbrush of 1cm or less is required. It is worth finding some old artists' paintbrushes if possible. I find that the bristles of cheap brushes tend to disintegrate quickly with the combined effects of the rough deadwood surface and the effect of the lime sulphur on the glue used to attach the bristles. Otherwise you can spend a lot of time carefully removing bristles from the deadwood!

The brush can be cleaned with soapy water, if done so immediately after use.

Lastly, have some absorbent paper cloth (kitchen roll/tissue) at hand to absorb spills and excess lime sulphur on the deadwood.

Finally. Does Lime Sulphur Actually Preserve Deadwood?

Yes and No.

Lime sulphur kills all (or at least most) bacteria that cause the breakdown and deterioration of wood that we know as 'rot'. It also produces a temporarily hostile environment against bacteria. However, the anti-bacterial or anti-fungal effect of the lime sulphur is relatively short-lived in comparison to its bleaching effect. Most enthusiasts will have seen lime sulphured wood begin to turn green and support bacteria within a relatively short period of time.

This short-term protection requires that the lime sulphur be applied on an annual or even 6-monthly basis to ensure that all of the wood remains stark white (if this is required) and to keep the majority of bacteria and fungi at bay.

Not only is the anti-bacterial effect of the lime sulphur relatively short-lived, but it only has an effect on the parts of the deadwood that it is able to access. As has already been discussed, lime sulphur is only able to permeate the wood of a tree to a certain depth (depending on the density and condition of the deadwood). Whilst lime sulphur is able to kill bacteria on the surface of the wood, and possibly to a depth of a few millimetres on a soft wood, the underlying layers of wood will remain unprotected.

If bacteria is able to access the underlying layers of wood that the lime

sulphur cannot (for instance through fissures or breaks in the integrity of the wood or through deadwood exposed only to the soil), rotting will continue unabated.

In summary, lime sulphur cannot and should not be regarded as a preservative that will protect deadwood from rotting or breaking down. While it is able to preserve shallow or thin areas of deadwood for a period of time, it is not a reliable method of rot-prevention.

For the dense and hard wood of Yews, Junipers and Pines, lime sulphur is probably going to be sufficient, as these woods are naturally resistant to rotting. On species with softer wood such as Privet, Bougainvillea and most deciduous species, a proper wood preserver or wood hardener must be used.

Refining the Trunk-Base Deadwood

The awkward base jin and shari at the base of the San Jose.

The final part of the Juniper styling was to reshape and refine the large jin and shari at the base of the trunk. This area was of maximum importance to the overall design of the Juniper as not only was this large in size, comparative to the tree, it was also in a very prominent position, immediately catching the eye of the viewer.

As has already been mentioned, in terms of design, jin and shari are little

different from the live parts of the tree, the trunk and the branches, and it is important that they are only included as an integral part of the overall design and not just as an ‘afterthought’.

The major design issue with the deadwood at this point was that it interrupted the movement and the flow of the eye; there were jin flying off the trunk-base at all angles!

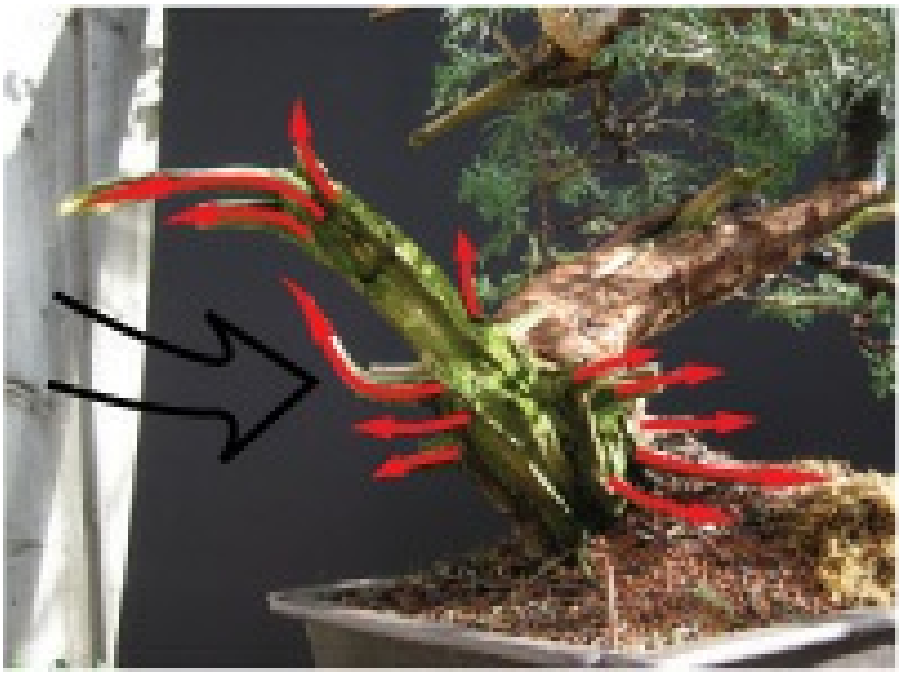


Diagram showing the overall direction of movement in the tree (in black), and the multitude of movement created by the jin (in red) at the base. As can be seen in the diagram, the heavily contrasting movement of the various jin clashed with the overall flow of the tree. For more details concerning Movement in Bonsai, please see the appendices.

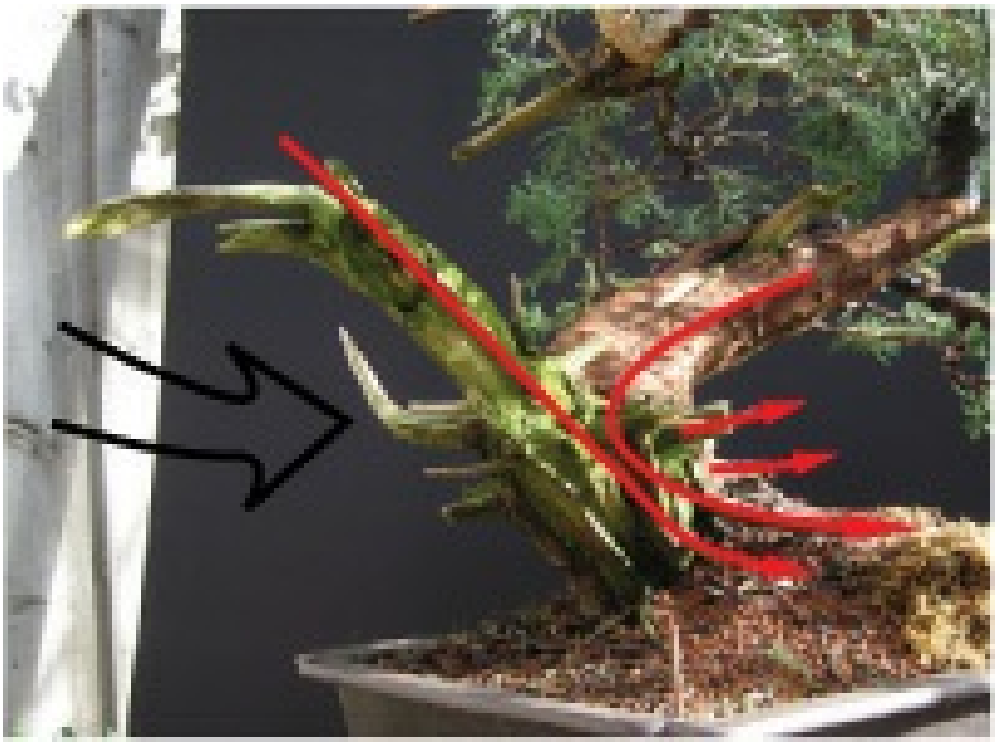


Diagram showing the overall direction of movement in the tree (in black), and in red, the cohesive movement I wished to create by re-shaping and refining the jin.

Splitting and pulling away the fibres of the jin at the base of the trunk.

I began refining the deadwood by removing those jin that did not flow with the movement of the tree. As with the jin I had already created on other parts of the tree, rather than simply cut them off, I split the ends and started pulling away individual fibres all the way down onto the shari itself.

Fibres being pulled away from the jin and down the shari itself.

Using jin pliers to pull away some of the wood on the large jin at the base of the trunk.

The resulting texture left by stripping the wood away.

The changing shape of the deadwood as I worked over it.

After removal of the awkward jins at the base and the large ‘bent’ jin.

The new shape of the deadwood after I had finished shaping it, all by hand-stripping the fibres.

Burning away the evidence of my work.

Once I was happy with the shape of the deadwood and the texture I had created, I used my gas torch to burn away all the fine burrs and snags in the wood, smoothing out any tool marks I might have made.

Super-heating the wood with the gas torch.

The burnt wood cooling down prior to being cleaned.

The deadwood after cleaning with a steel-wire brush.

Detail of the deadwood after cleaning with a steel-wire brush.

I felt that the deadwood surface was still a little plain and required further detail, and so I used my curved draw-knife to create channels up the grain. Any sharp implement with a ‘V’ shaped tip can be used to do this or, alternatively, a sharp knife can be used to create ‘V’ shaped cuts.

The draw-knife being used to create texture and grain in the deadwood.

After a further burning and cleaning with a steel-wire brush, a coat of lime sulphur was applied to whiten the wood.

Applying Lime Sulphur

It does not matter whether the deadwood is fresh and has just been created (from live wood) or has been allowed to dry out for a while, as is sometimes stated. You will find that new deadwood is slightly sappy and the lime sulphur will not take quite as well as when the deadwood is older, but it is not necessary to wait after creating deadwood before applying lime sulphur. It is also worth noting that lime sulphur does not harm the tree even if it comes into contact with freshly-cut green cambium.

If lime sulphur is painted onto dry wood, it tends to run off the wood rather than be absorbed. Ensure that the wood is slightly damp, if necessary by misting it with water prior to painting the lime sulphur. As previously mentioned, moisture (water) must be present for the Sulphur Dioxide to have a bleaching or staining effect.

Apply the lime sulphur, starting at the highest point of the deadwood. It is better to apply several thin coats over the course of a few hours than try to apply a thick coat all at once. Any excess lime sulphur will run down the deadwood. Be prepared to mop up any excess lime sulphur that collects at the base of the deadwood you are painting.

When painting shari at the base of the trunk, mop up excess lime sulphur before it runs into the soil or surrounding areas of live wood and bark. This is because the lime sulphur will also bleach the soil and the bark. Unless it is an excessive amount, lime sulphur will not kill the tree or damage the roots of the tree. However, if you are worried that too much lime sulphur has entered the soil, simply flush the lime sulphur out with water.

If any lime sulphur gets onto the bark of the tree, simply use some wet cloth to wipe away the excess lime sulphur. Do this as soon as possible so the lime sulphur does not have a chance of whitening the bark. If the bark still appears white when the lime sulphur has dried, just use an old toothbrush or similar to clean it.

The lime sulphur will dry and whiten the wood over the course of the next hours or days depending on how moist the wood is (the more moisture, the quicker the whitening takes effect) and the ambient temperature (the warmer the weather, the faster the lime sulphur will dry). Avoid placing the tree where the lime sulphur will be exposed to rain as this will cause the lime sulphur to run off the deadwood before it has had the necessary bleaching effect.

The use of a little water in the lime sulphur mix itself encourages the lime sulphur to permeate the wood more easily and helps it to whiten considerably quicker.

The completed deadwood at the base of the trunk after the lime sulphur had dried, whitening the wood.

The Fully-Styled Juniper chinensis 'San Jose'

Two days later, and three weeks after beginning the restyling, the lime sulphur had dried and the design was complete. A layer of short-stranded moss was added to the soil surface and these final images taken.

Juniper from the back.

Juniper seen from the left-hand side.

Juniper Bonsai seen from what will be the right-hand side.

The fully-styled tree seen from its new front view. Final height 17”/42cm, trunk base diameter 5”/12.5cm.

While the image would never be complete until the Juniper had been turned and placed into a new ceramic pot, I decided that for the health of the tree it would be better to leave the additional stress of re-potting until the tree had begun to respond favourably to my work and begun to grow again. Repeated pinching out of the tertiary foliage pads to create denser, compact, foliage over the next few years will also help complete the final image.

Species Guide

Juniper/Juniperus

Junipers/Juniperus

Along with Pines and Japanese Maples, Junipers are one of the three most frequently used genera for bonsai. Juniperus is a genus of 50+ species of evergreen, coniferous, shrubs from dry forests and hillsides throughout the world.

Junipers have foliage of two types: needle-like juvenile foliage and scale-like adult foliage. Species that exhibit predominantly one or the other are used for bonsai cultivation. The range of colour of the foliage ranges from steely-blue-greens to light greens, occasionally with silver or gold hues.

Most of the classic Juniper bonsai in Japan have been collected as yamadori from the mountains and can reach ages of 200 years or more. Many display large amounts of natural and artificially created deadwood called jins and shari's which are bleached brilliant white with lime sulphur.

Species and Varieties Suitable for Bonsai

The classic Juniper for bonsai is often referred to as the Chinese Juniper. This is a naturally occurring hybrid species called Juniperus x media which is a cross between J.chinensis and J.sabina. (Confusingly Juniperus x media is also referred to in some textbooks as Juniperus pfitzeriana.) The foliage can have a mixture of adult and juvenile foliage and, as this combination can disrupt the design of a bonsai, so varieties of J.media that display only one form of foliage tend to be used. Juniperus x media ‘Blaauw’ (named by a Dutch nursery ‘Blaauw & co’) is a strong growing conifer which carries bluish grey-green scale-like adult foliage. As with other J. x media, if needle-like juvenile foliage appears it can be pinched out until adult foliage appears.

Another very popular species for bonsai is Juniperus rigida, the ‘Needle Juniper’. As the name suggests J. rigida has sharply pointed needle foliage as has Juniperus communis, a plant found growing wild in many parts of Europe, though it should be noted that collected J.communis is notoriously difficult to keep alive for more than 2 or 3 years after collection.

Juniperus squamata (needle foliage), J.sargentii (scale foliage), J.chinensis, J.sabina, J.horizontalis procumbens, J.communis hornbrookii are also popularly used, as are dozens of other species and varieties.

Other Juniper Varieties Often Used for Bonsai

Shimpaku or J. sargentii

The Shimpaku is a Chinese Juniper variety with bright green new foliage that fades to a darker green when mature. The tree has naturally dense and compact foliage which is excellent for bonsai.

As with a number of Juniper varieties, the foliage can turn a brown or bronze colour after frost and will remain so until Spring when it turns back to a more familiar (and healthy-looking) green.

Blaaws Juniper or J. x media 'Blawii'

The Blaaws Juniper is more vigorous than the Shimpaku but has less naturally well-ramified growth. In comparison, the green foliage has a blue-grey tint.

Sabina Juniper or J. sabina

Common to Europe and similar in colour to the Shimpaku, the Sabina has looser but finer foliage that requires continual pinching out to encourage ramification.

San Jose Juniper or J. chinensis 'San Jose'

A Juniper with blue-green foliage and beautiful red bark, more commonly found in the United States. The San Jose is reluctant to form uniformly adult/scale foliage and on occasions enthusiasts will opt to it develop with juvenile/needle foliage only.

Blue-Rug Juniper, Creeping Juniper or J. horizontalis

A very common Juniper variety sold in garden centres and shopping malls across the world, J. horizontalis has very weak trunks and branches leading to a naturally horizontal, creeping growth habit. Predominantly mature/scale foliage in a range of colours from dark green to steel blue (depending on the specific variety). Trunks are very slow to thicken.

Himalayan Juniper or J. squamata

Very commonly found growing in European gardens and nurseries, J. squamata carries juvenile/needle foliage only in a wide variety of colours, depending on the variety. Very vigorous, fast growing, and responsive to bonsai techniques, but its appearance suffers from the retention of old needles that steadfastly remain on the tree after dying and browning off.

Common Juniper/J. communis

J. communis is the only truly native Juniper in the UK. A needle Juniper with dull-green foliage, the Common Juniper has a terrible reputation for dying inexplicably 2-3 years after collection. However, garden centre/nursery specimens appear to be far more robust.

BONSAI CULTIVATION NOTES

POSITION

Full sun, though Junipers with predominately scale-like foliage benefit from a little shade from the midday sun. During winter protect during frosts below -10°C but coniferous trees should not be over wintered in dark outbuildings unless temperatures are consistently below -10°C. At this point there is no requirement for light.

Never try to grow Junipers indoors. Though they may seem to tolerate indoor cultivation at first, poor humidity, lack of light and dormancy will eventually kill them. Do not trust a vendor, seller, book or website that claims Junipers can be grown successfully indoors. Dead Junipers can continue to display normal foliage colour for weeks or even months after they have effectively died.

WATERING

Ensure Junipers growing in poor, compacted, organic soils are not over-watered as they suffer root rot easily, foliage should be misted frequently to help keep pores free of dust, enabling them to breathe. In the case of trees that have been recently repotted or have root problems, misting is essential as conifers are able to absorb enough water through their leaf surface to maintain health until the roots are able to support the tree themselves. Misting also avoids excess transpiration and water loss on hot summer days.

FEEDING

Feed fortnightly. High nitrogen fertiliser from start of growth in Spring until Midsummer, balanced feed until late Summer followed by low nitrogen until winter. Occasionally replacement feeds with an acidic fertiliser such as Miracid are highly recommended, particularly in hard (lime) water areas.

REPOTTING

Repot in April, do not repot or root-prune too early in the year. Can also be very successfully repotted during the warmth and humidity of August,

however avoid repotting during very hot days.

Once established in a good quality soil, repot infrequently every 3-5 years. Never bare-root a Juniper or change more than a third of the soil (or at very most half) in any one repotting.

An inorganic-clay based soil is essential for Junipers as they are prone to very poor-health in old, compacted, organic soils. Because Junipers cannot be bare-rooted nor have more than one third of the soil mass changed in one year, it is essential that a soil with good particle structure is used. Avoid Akadama and similar low-fired clays that break down after one to two years.

WIRING

The wood of Juniperus is extremely flexible and branches of several centimetres in diameter remain supple enough to be shaped with ease. Junipers can be wired at any time of the year, including the semi-dormant period of Winter. Do not create heavy bends in trunks and branches during temperatures of 0ºC or less.

For a well-defined Juniper bonsai, the entire tree will require 100% wiring at least once in its lifetime.

The setting time for newly-wired branches depends on the thickness and the vigour of individual shoots; expect anything from 3 months to a year. The greater the amount of growth that emerges from a shoot, the quicker it will thicken and set into its new position. The thicker a branch is, the longer it will take to set.

Watch for wire suddenly cutting into the bark during the Summer as the wood will thicken dramatically during this period, however, shallow wire-marks are not a great problem and will disappear within a few months to a year (again depending on the strength and vigour of the individual branch).

PRUNING

As with all conifers, branches should always be left with enough foliage to support them. Never prune so heavily that a branch is almost devoid of foliage or it will die off.

Junipers grow from early April, as temperatures begin to rise at the beginning of the growing season, by producing a full flush of new buds and leaves. This is followed by new extending shoots through the Summer until early Autumn.

The foliage mass can be repeatedly pinched out or scissor-trimmed to shape throughout the growing season. However, after repeated pruning the foliage mass becomes very dense and can block air and light from getting to the lower and interior branches, causing them to weaken and potentially dieback. It is, therefore, important to thin out the foliage mass periodically (once or twice a year) to ensure even distribution of air and light to the foliage as a whole.

Pinching and Scissor Pruning Juniper Foliage

Junipers should be pruned using a mixture of two techniques: scissor pruning and pinching out. Foliage or shoot growth that has hardened, or is too strong to be pinched out using the technique described below, must simply be cut with scissors. Pinching such growth will require a lot of effort and very often the green bark will come away leaving a very thin piece of lignified wood behind.

Scissor-trimming a lignified shoot.

However, the soft foliage tips of a Juniper must be pinched out. Using

scissors on this type of growth will result in the tips turning brown, which often looks ugly.

The foliage tips contain a ‘weak point’. By holding the tip of the shoot between the pads of the finger and thumb and gently pulling away, the weak point of the shoot breaks cleanly and the foliage can be removed quickly and simply.

Care must be taken not to use fingernails to apply too much pressure; this will cause the foliage shoot to break at a point where browning off can occur.

Pinching out the foliage tips.

PROPAGATION

Junipers are easily propagated using several methods. To obtain thick trunks, air-layer branches from mature ground-growing specimens from May to the end of June when the new buds start to extend. Junipers are one of the easiest conifers to air-layer and, having rooted, can often be separated from the parent tree by Autumn.

Cuttings can be taken from April to September and will root from ‘heel’ cuttings. Use one year old shoots (shoots that appeared in the previous year) and pull away the shoot from the tree leaving a ‘heel’ of old wood at its base. Once potted up, cuttings can exist for up to 2 years on their own sap without rooting; however new extending foliage and shoots from the cuttings will be indicative of the cutting having new roots.

PESTS AND DISEASES

Relatively disease free though scale can be a problem. Poor draining water retentive composts regularly cause root rot

STYLING

All forms except broom in all sizes.

Collecting Garden Junipers

J. communis or the ‘Common Juniper’ is the only truly native Juniper found growing wild in the UK. A needle Juniper with dull-green foliage, the Common Juniper is a rare occurrence in the wild and is now a much protected feature of the British countryside. Coupled with a terrible reputation for dying inexplicably 2-3 years after collection, the opportunity for bonsai enthusiasts to obtain good quality Juniper material as yamadori, a collected wild tree, is rare.

Nonetheless, during the 1970’s, Conifers and, importantly, Junipers were very frequently planted as part of a ‘low-maintenance’ garden-design in housing-estates throughout Britain.

Many of these trees accelerated to heights of 20-30 metres within a decade and were hastily chopped down by home-owners desperate for some light in their gardens.

However, well-behaved, slower-growing or prostrate varieties planted during the 1970’s can still be found in older gardens. Approaching 40 or 50 years of age, these specimens are a fantastic source of material, with thick trunks ready for bonsai enthusiasts to collect.

Garden Juniper Identification

One downside of the multitude of different Juniper species and varieties that have been made available in garden centres over the past decades, for us as enthusiasts wishing to dig up an old garden specimen, is that it can be incredibly difficult to accurately identify the exact Juniperus species and/or variety.

Nonetheless, many aged garden Junipers will have some value, dependent on the colour and form of the foliage. Blue and green, scale or needle foliage is desired. Gold varieties tend to be quite strong but rarely have much more than novelty value as bonsai. Variegated varieties are best avoided as they will tend to be weak and their foliage is unlikely to be suitable for bonsai.

Look for trunks that have good movement. Trees with ramrod straight trunks can be used if they have plenty of low-down foliage to work with and some taper, otherwise they are best avoided!

Finally; do not confuse Juniperus with Chamaecyparis species of which there are also many planted in our gardens. Chamaecyparis are similar in

appearance to Juniperus but on closer inspection can be seen to have a typically multi-trunk growth habit and 'sprays' of scale foliage unlike that of Juniperus.

Collecting a Garden Juniper

Juniper growing next to the drive in a front garden in London.

This Juniper (species unknown) was discovered growing in a front garden in London by Faisal Waheedy in early 2009. Faisal had noticed that despite the tree's small size it had an impressive trunk that, on closer inspection, also had great movement. After speaking to the owners of the property it became apparent that the tree had been growing in its current position alongside their driveway for at least 30 years. During that time, the Juniper had had car-doors opened on it and been brushed against by human traffic on a daily basis for decades, hence its diminutive size.

The owners themselves were delighted at the offer of having the tree dug up, removed and replaced with a smaller ornamental plant, all for free! And so one cold day in February 2009, I collected the tree for Faisal.

The author digging up and collecting the Juniper.

Junipers are not a thirsty species and, in the relative luxury of a damp garden flower-bed, will rarely produce a large rootball. Once I had dug a trench around the tree, severing a small number of more adventitious roots, the rootball was freed from the ground.

The rootball of the Juniper immediately after collection.

Upon inspection, the rootball that I had recovered was densely packed with fine roots, giving it an excellent chance of survival.

The Juniper bagged up and loaded into the back of the car for the journey home.

As our journey back to Faisal's house was barely 5 minutes, the rootball was simply wrapped up into a large plastic bag and the tree was taken to its new home.

Once the tree was unpacked, I carefully pulled away the excess ground-soil from around the roots with a wooden chopstick. As has previously been noted in this chapter, it was important not to bare-root or wash the rootball and the roots needed to remain covered in the original soil.

With the tree up on a workbench we were finally able to inspect the trunk itself in better detail and decide our preferred front.

Inspecting the trunk of the Juniper.

The Juniper potted up.

A bonsai pot, large enough to contain the roots without first needing to prune them, was obtained and the tree planted up in 100% high-fired clay to ensure good drainage. In the coming years the remaining ground soil will be removed as the root system of the tree extends into the high-fired clay.

The Juniper was placed in a sheltered position, out of the sun and wind, until it began to extend new shoots 4 months later at, which point it was moved into a sunny position to re-establish itself.

The Juniper two years later, during the Summer of 2011.

Two years later and the Juniper had grown with such vigour that I had been able to preliminarily wire the primary branches to open up the foliage mass and prune back those shoots that had grown outside the silhouette of the

proposed design for this tree. From an old tree growing alongside a driveway in suburban London, the Juniper has already come a long way and has a great future ahead of it.

Appendix 1:

Field-Growing Trees for Bonsai

A common misconception amongst newcomers to the art of bonsai is that trees (bonsai) with large, thick trunks must have had decades of training to become the size they are and that a seedling with a thin trunk will one day acquire a thick mature trunk despite it being planted in a bonsai pot.

Unfortunately, once a tree is growing in the confines of a small pot, with its roots restricted and upper growth regularly pruned, the trunk and branches of the tree will only thicken very slowly.

Large bonsai with thick trunks are nearly always developed in the ground prior to being planted into a pot; some are purposely field grown, some are collected mature trees.

As a tree develops new growth during the growing season, it lays down new wood to feed and supply its new shoots and leaves. The more new shoots and foliage the tree produces, the more new wood that is formed to support the new growth. This new wood grows around the outer ring of the trunk and branches in an almost direct passage from the new shoots, back through the trunk to the root system, gradually increasing the trunk's diameter. Therefore, the greater the amount of new growth a tree achieves in a season, the greater the increase in the girth of its trunk over the course of that season. And so, a tree that is allowed unrestricted growth will always thicken faster than a tree that is pruned.

The best way to promote unrestricted growth in any tree or shrub is to plant it into the ground; a large container is an alternative but not equivalent to growing in the ground. (This is chiefly due to the difference in dynamics of soil held within a container and that of a large mass of ground-soil; be wary of planting trees in overly large containers, this can in fact slow growth.)

Field-growing techniques can be used within any area of ground. If an area of land is unavailable to you (as is often the case), trees can be enjoyed while they are grown-on in the garden amongst ordinary garden schemes, as 'temporary' 5-10 year hedges or as 'temporary' garden specimens. It is also possible, with a little work, to build raised beds specifically for the purpose of

field growing. Raised beds can be walled with brick or wooden planks and filled with good quality soil.

Any tree/shrub species can be used for field growing as long as it is hardy in your local climate. Native species naturally thrive in your local climate and will therefore respond favourably to give the best results; other species will develop well but can take longer to grow with real vigour.

Any age or size of tree is suitable for field growing as long as it is large enough to compete with any grasses or weeds that might compete for light or moisture. Generally, cuttings, seedlings or saplings should be at least 2 years old before planting out unless you are able to cosset them throughout the first year.

Growth Rates To Be Expected From Field-Growing

Typically, trees will spend the first year establishing in the ground with some reasonable top growth. The second year will start to show strong growth and bulking up of the trunk. By the third year you should expect to see extremely vigorous growth. Some species such as Trident Maples, Elms and Hornbeam will have easily reached heights of 12ft+ by this stage if left unpruned.

With regard to the trunk diameter, quick growing species such as Tridents, Field Maples, Hornbeam, Elm and Scots Pine can see an increase in trunk diameter from 1/2” as saplings to 2” to 3” at the end of their third year in the ground. Peter Chan of Heron’s Bonsai has described how a 1” diameter Field Maple he planted into the ground 18 years previously, had achieved a 15” trunk!

General Care and Maintenance of Field-Growing Trees

One of the benefits of field growing is that a large number of trees can be planted out for future use as bonsai and left to their own devices without the need for high maintenance care.

Before planting, improve the condition of the soil, though it is not necessary (or possible) to expect a soil of the standard used for container growing. Clay soils should be improved by adding grit, sand or compost to open up the soil and improve drainage, thin gritty soils should have compost added to improve water retention and nutrition.

For their first season after planting out or after root pruning, care must be taken that the ground is not allowed to dry out down to more than a couple of inches below the soil surface as the root system will not have had a chance to extend further in search of moisture. However, do not keep the soil continually wet as this will actively discourage the roots from growing in search of water, making the tree less drought resistant.

Trees over 3 or 4 ft that have a shallow root system should be staked to guard against being overturned by the wind. Tie the tree to a stake using tree-ties to reduce damage to the bark on the trunk. Try to tie the tree low down on the trunk; though it is necessary to steady the base of the tree to stop the roots being disturbed by the wind, repeated flexing of the upper part of the tree in the wind will help thicken the trunk.

Keep weeds that grow around the trees to a minimum, especially around young trees that may not be established enough to compete for light or water. Be wary of weeds that might shade out and cause the eventual die-back of the tree's lower branches. It should also be noted that the presence of low-growing weeds will be of no detriment to the tree if they are not shading branches and can greatly reduce the time it takes for mature bark to appear. Weed suppressing membranes can be used on the soil surface prior to planting. This will keep weed growth to a minimum but can cause difficulties in future years when trying to root prune or collect your trees.

Regular feeding of field growing trees is unnecessary though they do benefit from one application of Growmore (or similar slow-release fertiliser) in the spring and one in the summer, particularly on thin, stony soils.

Pruning Field-Grown Trees

Primarily, the purpose of field-growing is to develop a thick trunk base and nebari. Until the trunk has developed, there is no need to consider the final branch positions (unless the tree is coniferous).

Ordinarily, once the trunk has reached its final size and girth, all branching will be too thick for use as bonsai and will need to be removed and restarted.

Do avoid continually interfering with your tree! Any pruning will result in less growth and less increase in trunk diameter. Bear in mind that the more wood the tree carries, the thicker the trunk will become and the more growth it will put out during the forthcoming season.

The only pruning that should be necessary is during the winter in order to control or redirect the trunkline depending on how you envisage the finished trunk to look.

Root Pruning Field-Grown Trees

Root pruning your field-grown trees will slow down their growth rate and negate the purpose of field-growing. However, it is important that the future nebari and root structure are developed or there is a risk that your fat field-grown trunk will be ruined by a poor nebari.

Root pruning should be carried out in early spring as is done with bonsai. Roots should only be pruned to encourage a good nebari. Every second or (preferably) third year, lift the tree and examine the root structure. Any roots close to the trunk that are felt to be unsuitable for future use (for instance crossing roots, roots growing at awkward angles from the trunk, a thick over-dominant root or very straight roots with little branching or taper) can be removed.

Unless you have had the foresight to plant the tree on top of a tile, it is also important to remove or at least shorten any downward growing roots. Try to remove as little root as possible and no more than a couple of major roots in one year.

In the last year or two before finally lifting the tree to begin bonsai training, cut around the base of the tree with a spade in early spring to encourage finer root growth closer to the trunk.

Appendix 2:
Air-Layering

Layering is a method of creating new bonsai or 'potentsai' from trees or shrubs that, in their present state or stature, are undesirable or unsuitable for bonsai cultivation.

Bonsai can be created from well-formed branches of fully grown trees, poor quality bonsai can have desirable sections rooted and separated from the rest of the tree, and good quality material with poor nebari can have new suitable nebari formed as air-layering produces roots emanating radially from around the new trunk.

Layering is also a straightforward method of propagation that, although relatively unused in the West, has been tried and tested in China and Japan for centuries. For some species such as Acer Palmatum and Azaleas, layering is the most reliable way of creating new stock vegetatively.

The principal of layering in all its forms is to injure the wood of the parent tree, so that the flow of nutrients from the parent tree's roots to the layering's leaves is kept intact, whilst the flow back from the layering's leaves to the parent tree's roots is interrupted.

The injured part of the bark slowly heals, forming a callus from which adventitious buds are able to form new roots into the growing media. The layering continues to be supported by the parent tree, however, the food energy its leaves produce go into building its own new roots. When the layering has sufficient roots of its own, it can be separated from the parent and is then able to support itself.

Layering should always be carried out in spring when the first flush of leaves has hardened on the parent tree and the parent tree is putting on a great deal of root growth of its own. This timing allows enough time for a layer of many tree species to become established on their own new roots before the onset of the following winter.

Ground-Layering

This form of layering mimics the process by which some species

propagate themselves naturally. Low branches on some plants come into contact with the ground as they lengthen and become weighed down by their foliage; from these points, adventitious buds produce roots into the ground and the root system eventually becomes established enough to support the branch as a plant in its own right.

Suitable species for ground-layering include Acer, Azaleas, Berberis, Buxus, Chaenomeles, Chamaecyparis, Cotoneasters, Euonymus, Forsythia, Hedera and Wisteria. It is always worth investigating around the base of all of these species when found growing in the garden or field to see if there are any naturally occurring ground layers that can already be removed.

To create ground-layers artificially, try to find fairly young growth that will touch the ground; make an upward slit in the underside of the bark where roots are required. Dust with rooting hormone and wrap the wound with long stranded sphagnum moss. The section of the branch to be rooted now needs to be shallowly buried in the soil and pegged in place with a piece of U-shaped wire.

This process should be carried out in spring and should be left for at least three months ensuring that the area is kept damp. If the layer has failed to root after 3 months, re-cover it and leave until late summer. If it has still failed to root by this time it is still worth leaving it in position until the following spring. When successfully rooted, the new plant can be removed and planted up.

Don’t be too eager to separate the layering. It is better to leave it intact until there is enough root system to support the layering, rather than remove it too early and watch it slowly die. If there are not sufficient roots on the layering by September, it is better to leave detaching it until the following spring, as any new immature layering may not survive on its own through the winter cold, however hardy the parent plant is.

Air-Layering

Air-layering is similar to ground-layering except that it utilizes branches that are growing off the ground and so the injured bark/rooting point has to be encased with growing media wrapped in polythene (or similar). Branches of up to 2” (or much more) diameter can be successfully rooted, leading to the possibility of creating new plants with great potential for bonsai.

Branches on fully-grown trees have particularly vigorous growth and can be pruned over successive seasons to form thick, tapering, trunks for bonsai, which can then be air-layered from the parent tree.

For deciduous trees, air-layering is carried out in April to May as new growth hardens off and changes to its summer colour. For evergreens, air-layers should be left until a little later; from late April until July.

There are two methods of injuring the parent tree to provide a site for new roots to grow. The most frequently used technique is ring-barking. Use a sharp knife to cut two parallel slits at least twice the diameter of the branch around the circumference of the branch. Remove the ring of bark between these two cuts and the underlying cambium layer (which is green and 'soft').

Make the ring-bark just below where roots are required on the parent-tree's branch. The ring-bark should be made just below an old leaf node as it will contain many adventitious buds, all with the ability to become new roots.

Do not be tempted to leave a strip of bark across the ring-barking as this can allow the parent tree to bridge the air-layering and no new roots will be produced. For the same reason, ensure the ring-barking is wide enough so the parent tree is unable to bridge the gap as it heals.

The cambium must be entirely removed; this means removing the entire green layer below the bark as well as any other soft white pithy material, leaving just the 'shiny' white wood underneath the cambium layer.

One of the main reasons that air-layers fail is when the cambium is not entirely and thoroughly removed. With many tree species, the tree will try and bridge the ring-bark; this is easier for the tree than producing a new root system. Purposely leaving a 'bridge' of cambium, as is occasionally recommended and tried, is a sure-fire way to ensure that the tree does not have to produce new roots.

The alternative method to ring-barking is the tourniquet. This is suitable for species that are unable to cope with the removal of a complete ring of bark. A piece of wire is wrapped very tightly around the branch below the proposed rooting site. As the branch grows the tourniquet bites into the bark and then the cambium layer slowly interrupts the flow of nutrients from the leaves down to the roots. The tourniquet method, however, is slower to work and more vigorous species can bridge the tourniquet as they grow, resulting in a failure to root.

With both methods, dust the section to be rooted with rooting hormone and tightly wrap wet long-stranded sphagnum moss around the whole area. The sphagnum moss is then held in position with clear polythene or a clear plastic bag. Tie the bag securely and make a small hole in the top to facilitate watering.

Whilst waiting for the air-layering to root, ensure the moss is kept wet. After anything between 3 weeks and 3 months, dependent on species, white roots will be seen growing inside the bag. Allow the bag to completely fill with roots; ensuring the moss is kept damp at all times. When the roots have matured and turned brown, the layering can be removed from the parent tree.

Remove the plastic bag or polythene but leave the moss in place as the roots are very easily damaged at this point. Remove as much of the branch below the new rootball as possible and plant the air-layer in a pot of bonsai compost or pure sphagnum moss. Ensure that the layering is tied into place with string, wire or raffia to stop it rocking about in the wind and damaging the new root system. Keep the newly-potted layering in the shade and mist regularly until it is established.

Winter Protection for Air-layers

There seems to be general panic where the winter and air-layers are concerned. The cold and frosts will not damage the air-layer itself. The air-layer itself is just a wound that will have callused over. You don't pamper a wound from a recently removed branch during the winter so why an air-layer? Any new roots that are already growing from the air-layer will be more susceptible to extremes of cold in the same way as roots in a small bonsai pot are.

However, they are insulated in sphagnum and plastic (you can add a layer or two of fleece or bubble wrap if you wish). If the new roots are damaged or dieback during the winter, they will be replaced in spring when the parent tree starts growing again.

New trees (produced by airlayers) should be separated at least 6 weeks before the first frosts, this allows the new roots enough time to grow and strengthen before winter. If there are insufficient roots on an airlayer to separate it from the parent plant in the autumn, leave it until the following spring.

Genera/Species suitable for the tourniquet method include:

Abies, Acer, Cedrus, Cercis, Chamaecyparis, Cornus, Fagus, Juniperus, Larix, Lonicera, Malus, Picea, Pieris, Pinus, Podocarpus, Prunus (don't use copper wire), Pyrus, Quercus (with difficulty), Azaleas and Rhododendron, Stewartia, Taxodium, Taxus, Thuja, Ulmus, Virburnum, Wiegela, Wisteria and Zelkova.

Genera/Species suitable for the ring-bark method include:

Acers (Red leaved varieties can be very slow to root), Berberis, Buxus, Camellia, Carpinus, Cornus kousa, Corylus heterophylla, Cotoneaster, Cryptomeria, Gingko, Hamamelis japonica, Hedera, Jasminium, Juniperus, Ligustrum, Lonicera, Morus, Magnolia stellata, Myrtus, Parthenocissus, Prunus, Punica, Pyracantha, Rhododendrons and Azaleas, Serissa, Syringa, Tamarix juniperina, Thea sinensis and Ulmus.

(These lists are by no means exhaustive; most woody trees and shrubs that back bud/readily produce adventitious buds on old wood can be air-layered with a good chance of success).

The Acer palmatum/Japanese Maple branch to be air-layered.

This Acer palmatum branch will be used to create the air-layer.

It is late May and the spring leaves on the parent tree have just started to harden off, so now is a good time to make the air-layer.

After ring-barking the branch.

A strip of bark is removed just below an old leaf node. After the bark is removed, the entire green cambium layer below it is carefully scraped away; any cambium left makes the layer fail by allowing the tree to bridge the ring-bark.

It is essential to remove all of the cambium layer and to make sure that the ring-bark is wide enough. This is the main reason for air-layers failing.

The completed air-layer after wrapping the ring-bark with sphagnum and plastic.

The area is dusted with rooting hormone, wrapped with sphagnum moss and held into position with a clear plastic bag.

6 weeks later and roots have begun to appear.

Six weeks later and the new roots have appeared in the bag. At this point, care must be taken that the sphagnum moss is kept damp, as the new roots are actively drawing moisture from the sphagnum moss.

The air-layer immediately after separation from the parent tree.

The Acer palmatum after potting up.

Another couple of weeks are allowed to pass whilst the new roots strengthen and then the air-layer is separated from the parent tree.

The tree is then potted up and pruned back heavily to reduce the stress on the new roots.

It is very unlikely that the new tree will put out any new top growth for the remainder of the year; instead it will produce a big flush of root growth.

The new root system will still be relatively weak for the first year and, during the following winter; extra protection should be given to the tree.

New roots appearing through the drainage holes of the pot.

Within a few weeks, the roots of newly potted air-layer have filled the pot and are beginning to grow out of the drainage hole. However, as one should expect, there is no new top growth and there will not be until the following year.

Appendix 3:

Choosing the Right Pot For Your Bonsai

The literal meaning of bonsai is 'plant in a tray'. While the tree itself contributes to one half of the composition, the pot completes the overall image. The 'bonsai' in its literal sense is judged by the visual impact of both the tree and the pot.

Unfortunately, choosing and locating the correct, or the best, pot to plant your tree into is not easy. While a well-chosen pot will enhance a bonsai and strengthen a design, a poorly chosen or unsuitable design can actually lessen the impact of the tree. Ultimately, until the 'right' pot is found, the tree will never reach its full potential as a bonsai.

A pot can be an expensive investment for your bonsai. Buying an unsuitable pot for your tree can mean having to find a more suitable pot in the future. Finding the right pot, first time, is not only satisfying but saves money and helps avoid ending up with a pile of pots that don't quite seem to suit any of your trees!

This article is written to help the enthusiast understand how to go about choosing the correct pot for their tree. My express thanks go to Vic Harris of Erin Bonsai for his help in writing this guide and for providing images of some his pots to illustrate this article.

Choosing the Right Pot for Your Tree

Choosing the best pot for a particular tree is not easy. As well as the more mundane factory-made Chinese and Korean pots there are a number of bonsai potters and potteries throughout the world that are able to offer individual and diverse pot designs and glazes to the enthusiast. There are so many available colours, sizes and designs that it can become very difficult to identify exactly which one(s) are best for your tree.

Pot choice is also subjective. Ultimately some of the final decision will be made according to your own personal tastes. Some enthusiasts prefer more conservative pot shapes, textures and glazes, other enthusiasts prefer to make

more unusual ‘individual’ choices.

In an effort to help choose the correct ‘type’ of pot for your tree I have asked Vic Harris to help me draw up some basic guidelines when choosing a new pot for your tree.

To arrive at a good decision, it is useful to break down the choices into 4 parts. Pot dimension, pot shape, pot colour and texture.

Choice 1: Pot Dimensions

The first thing to consider is the size of the pot that you will need. The correct pot dimensions can be achieved using some basic rules according to the dimensions of the tree itself.

The general rule of thumb is that the pot’s depth should be equal to the diameter of the trunk just above soil level.

For oval or rectangular pots, the length of the pot should be 2/3 the height of the tree.

For round pots, the diameter of the pot should be 1/3 the height of the tree.

For trees with especially wide canopies a wider pot can be necessary and this can be compensated for by using a slightly shallower pot.

As equally, a tree with a very thick trunk (in comparison with the height of the tree) may suit a slightly deeper but narrower pot.

It should be remembered that these guidelines are based on aesthetics only. For horticultural reasons, some tree species require larger or smaller pots. Species with very fast growing roots such as Trident Maples often require deeper pots whilst flowering and fruiting species such as Crab Apples require more root run and therefore deeper pots.

Choice 2: Pot Shape

The style of pot that you choose will need to harmonise with the tree. You need to take a look at your tree and evaluate its characteristics. Try to decide whether your tree is masculine or feminine. Many trees are a combination of both, although usually one is dominant than the other. This is very subjective; for some people a tree may be masculine, for others, it might be feminine. Ultimately, as the owner of the tree, it is for you to decide. It should be noted, though, that a firmly masculine tree will never look right in a very feminine

oval pot; in turn a feminine tree will always look awkward in a masculine pot.

What makes a tree feminine or masculine?

A masculine tree gives an impression of strength. It might have a heavily tapered trunk; have craggy, mature bark and/or strong angular branching. It may have deadwood. It may have a straight, powerful trunk or a dense canopy.

A feminine tree will have a more delicate appearance, a smooth trunkline, smooth bark and sinuous movement in its trunk and branches. A light canopy and slow taper.

Some tree species are predisposed to being considered feminine or masculine. Pines or angular Hawthorns are often considered masculine, whereas delicate Japanese Maples will be considered as naturally feminine.

However, a strong, heavily-tapered Japanese Maple with delicate leaves and branching could be considered to be a feminine species with masculine features, whilst a tall Hawthorn with craggy, rough bark, gentle curves and very gradual taper could be considered a masculine species with feminine characteristics. With trees such as these it is necessary to identify which is the strongest feature and reflect it. Is it the craggy, fissured bark of the hawthorn or the gentle curves of the trunk that have the strongest visual impact? Is it the delicate branching of the Maple or the powerful tapered trunk that attracts your eye most? Fortunately, it is possible to find pot designs that can reflect both femininity and masculinity.

Pots are considered feminine or masculine. Deep pots with strong angular features are considered masculine whilst more feminine pots are shallower with softer lines.

For instance, strong chunky, deep rectangles with sharp corners are very masculine pots, as are square pots. These are suited to thick heavy-trunked masculine trees, especially conifers.

For thick-trunked deciduous trees, the corners of the rectangle can be rounded, thus reducing the masculinity of the pot a little.

Working down through the scale of masculinity, deep chunky ovals come next and then we have drums/round pots that are androgynous i.e. are suitable for a masculine or feminine tree.

After this we move into the feminine pots, which are shallow delicate ovals and very shallow round literati pots.

Pot Shape Basic Guidelines

Rectangular pots are suitable for coniferous species and big deciduous trees with very pronounced taper, wide base, heavy buttressed nebari. These are used for masculine trees to add a feeling of strength in the tree

Oval pots are suitable for reflecting the femininity of deciduous trees, clump-style bonsai, groves and forests. The less taper the tree has, the more feminine it tends to become. Sinuous curves can also dampen the masculinity of a tree.

Round pots are suitable for coniferous or deciduous feminine trees, particularly (but not exclusively) for literati/bunjin trees. Tall straight or sinuously curved trees with very little taper are the most feminine and the pots that tend to suit these trees are very shallow rounds.

Pot Lip or Rim

A lip on the upper rim gives additional strength to a masculine tree.

A straight rim is softer for more androgynous trees.

A bowl/convex side is more suited to feminine trees.

Pot Corners

Sharp, right-angled corners are masculine and suitable for masculine trees.

Indented corners on a rectangular pot soften the masculinity of a pot.

Rounded corners soften the pot further, beginning to resemble an oval pot and more suitable for masculine deciduous trees

Feet of pot

The main purpose of feet on a bonsai pot is to allow for good drainage and airflow, but feet can also be used to change the pot's appearance. Feet can be subtle and decorative or strong and robust.

These qualities can be used to influence the overall feel of the pot. Big chunky feet can add strength to the design and understated delicate feet will have the opposite effect.

Choice 3: Pot Colour

Once you have decided on the shape of the pot, next you need to think of the colour and texture.

Every tree is unique. Although it is possible to generalise about a particular species, each individual tree will have something to pick up on as no two trees are exactly the same and there are always small variations that can be brought out in the pot colour and texture.

The colour of the pot can be used to pick up on a feature of the tree and, therefore, helps the tree and pot colour 'work' well together. The colour in the tree that is complemented can be that of the bark, for instance an unglazed red/brown pot picking up the bark of a Juniper. It can complement the colour of the leaves through the summer or the autumn colour. On fruiting or flowering trees, the colour of the pot can be used to complement the colour of the flowers or the berries.

Pot Examples

A very masculine pot with sharp corners, strong feet and a rough texture. This pot would suit thick-trunked pines. The dark brown/rusty-textured unglazed finish would complement the rough bark of most coniferous trees.

Slightly less masculine pot. Soft cornered rectangle, no lip, and inconspicuous feet. This pot with its blue/gray glaze would suit a heavy-trunk Acer.

This pot, although an oval, still has some masculine qualities. It is deep and has a strong outward square lip. With its red/pink glaze this pot would suit a heavy-trunked flowering tree such as an Azalea.

Next we have a drum, suitable for masculine or feminine trees. With this grey glaze, this particular pot would suit a Hawthorn, Oak or even a European Larch.

Here we have a feminine oval with a very gentle curved profile and a cream/beige glaze. Any of the lighter coloured more delicate trunk deciduous trees, with smooth bark would look good in this pot: Acers, Beech and Ash.

Lastly, we have a shallow round literati style pot. Although this a

feminine style, often the trees used for this style have masculine features, i.e. rough bark, and this is taken into account by adding a rough texture to the pot. This pot would suit literati style junipers and pines with the rusty brown and verdigris unglazed finish.

Examples of Tree and Pot Colour Combinations

European Larch. This pot is unglazed and coloured with layers of grey and brown slip. This has given the pot a finish that is very close to the colour and texture of the bark.

Acer palmatum/ Mountain Maple. Here we have a delicate feminine oval pot with a subtle off-white glaze which is quite under-stated and which complements the varying colour phases of this tree's foliage throughout the year.

Privet. Here we have something that is a bit out of the ordinary. Harry and I worked closely on the design for this pot together. Harry saw a twisted nightmare scene in the contorted exposed roots of this bonsai. Even though this pot makes a strong statement, it completely harmonises with tree. The colours and texture are a perfect extension of the tree.

Spiraea. Generally group or multiple trunk bonsai suit shallow pots. These types of pot give a sense of space and help to create perspective and depth. This pot picks up on the colour of the bark with a very close match of colours, I also felt that it would be nice to emphasise the contorted trunks with movement in the pot.

Here we have a cascade Hawthorn. This bonsai was designed with the carved portion of the pot to the front, to mimic a rock cliff or mountainside. This is the sort of terrain where this style of tree would be found growing naturally.

Although you generally want the colour and texture of a pot to match some characteristic of the tree, sometimes contrasts can work very well, for example, the red leaves of a red-leaved tree's work well with a blue pot.

The colour can also be used to accentuate the energy of the tree. Warm colours such as browns, reds, oranges and yellows provide a feeling of warmth and stability to the tree, whereas cold colours such as blues and greens can balance and refresh the overall composition.

Warm and cold colours can be used to contrast with a bonsai. Warm colours can be used for tiny (mame-sized) bonsai to exaggerate their colour, whereas cool colours can be used to tone down bright-leaved species.

Basic Guide to Tree/Pot Colour Combinations

This is a very basic guide designed to be a starting point or general guide to colours that can be suitable for any given tree and of course the final choice can be altered to suit the individual characteristics of any given tree.

Light browns/Oatmeals

- Acer, Elm, Beech, Oak, Larch, Hawthorn, Ash, Gingko

Off whites/Greys

- Hawthorn, Oak, Acer, Ash

Light greens

- Acer, Ash, Beech

Dark greens

- Acer, Azaleas, Chinese elm, Cotoneaster

Medium Browns

- Elm, Birch, Mountain Ash, Acer

Dark Browns/Red Browns/Unglazed Reds/Browns

- Pine, Juniper, Cotoneaster, Larch and other

conifers, Azaleas

Light blue

- Azaleas, Malus and other flowering species

Matt Blues

- Acer, Juniper, Pine, Azaleas

Matt Blue/Greens

- Pine, Junipers, Acer, Azaleas. This combination will also suit just about any tree as they are the colours that you see most trees framed by when in their natural state.

Choice 4: Pot Texture

Textures in a pot are again used to complement a tree. Smooth clay finishes are suitable for more feminine trees whereas heavily textured pots bring out the masculinity and wildness in a tree.

Texture Examples

This pot is very textured; it has a very coarse, gritty feel to it and would be suitable for most pines.

This pot is very smooth and has a quite gentle feminine feel to it. It would suit Acers, Beech or Ash.

This pot has a smooth glaze but lots of texture added to the lower portion of the pot. This is an interesting way of adding texture to a pot and mirrors the composition of the tree itself, with the glaze complementing the foliage and the unglazed portion picking up on the trunk. This pot would suit semi-cascade style Junipers or Pines.

This pot has texture within the glaze itself, the sort of softer textures found in some deciduous trees that develop subtle texture as they mature. Trees like Beech, Oak, Mountain Ash.

As can be seen in this article, choosing the correct pot is not simple but it can be learnt. Ultimately, a combination of personal tastes, knowledge and experience makes the process much easier.

When buying pots for your bonsai try to make sure you know the pot measurements needed for a tree. It is no good buying a suitable pot only to find it is too big or too small for your tree.

Have a good idea of the shape that will suit the masculinity or femininity of your tree.

Have a good idea of the colours and textures that will suit your tree.

Don’t be embarrassed to ask the advice of the bonsai nursery or the potter you are buying from. An experienced potter or bonsai nursery will always be able to give you a number of suitable pots to choose from. However, always try to have a picture of your tree to hand as this makes the nursery or potter’s job much, much easier!

Appendix 4:

Photographing Bonsai

I am by no means a professional photographer but, as a bonsai artist as well as a writer, it is necessary for me to take good quality images of my trees and, over the years, I have developed what I believe to be a fail-safe method for taking good quality images on a regular basis.

I try to keep things as simple as possible so I can take pictures quickly and with as little preparation as possible, otherwise the act of regular picture-taking and recording the progress of my trees becomes a chore in itself.

The most important piece of equipment (other than the camera) is the back-drop. Without a back-drop, the subject of the image itself, the bonsai, becomes lost in the noise of items in background and the detail of the tree is lost. However, backdrops made from old bedsheets or loosely draped fabric very rarely produce satisfying results and any creases in the material often looks distinctly amateurish, spoiling what would otherwise be an excellent photograph.

After using a selection of backdrops over the years, I now use a large timber frame made from 4 cm x 2cm timber which is large enough for a piece of black photographic cotton fabric, 180 cm x 130 cm in size, to be stretched over it very tightly and stapled.

The timber frame is then stored away to one side, ready to be placed behind the bonsai whenever I wish to photograph it.

For more formal images of bonsai I also use a black base-cloth. This is literally another piece of black photographic fabric which is placed on top of a wooden board.

For the best images, I always try to choose a time when the sun is out and is shining on the tree, as this produces a more dynamic image of the tree. However, I always try to make sure that the backdrop is shaded as it then truly disappears into the background.

To compensate for harshness of the direct light and the possibility of ‘white-outs’ (particularly on Lime-sulphured areas of a bonsai) I manually speed up the exposure rate on the camera. Finally, always use a tripod to

avoid camera shake!

As for the tree itself... very thorough preparation of the tree is essential. In a photograph every single branch that is not placed 100% accurately will stand out like a sore thumb! (In my eyes if not anyone else's!) While preparing the tree for photographs, keep looking at it with one eye closed. This removes the element of 3 dimensions that a tree has in real-life and allows you to see how the bonsai will appear in a photograph. If the preparation of the trees requires anything more than wiring just a few branches, then wait a few days until all of the leaves on the tree have re-adjusted themselves upwards toward the light again. Finally, make sure that the trunk, pot and soil are all given a clean and prepped properly.

The base-cloth being used for formal images of the fully styled tree.

Lastly, always take as many images as possible of the tree, including photographs of it at slightly differing heights and angles. There have been many times that I have found that a slightly different view of the tree than the accepted front (the tree seen directly straight on with the middle of the tree at eye-level) looks better.

At present I am using an Ixus (top of the range Canon or Powershot)

‘point and click’ 10 mega-pixel camera. By no means the best camera in the world, however, it is competent.

Appendix 5:

Hard Water, pH and Their Effect on Bonsai

Having spent many years growing bonsai in the North West of the UK using local slightly acidic, soft tap water, I was a little apprehensive of maintaining my bonsai with the notoriously hard water of the South-East when I moved to the London area in 2008.

Having now maintained my bonsai for 4 years with hard tap water that has a lime content, I feel it is worth sharing the experience that I have acquired. Most importantly it should be understood by all enthusiasts that if their tap water is hard, it does have an effect on their plants and most importantly, their bonsai.

The hardness of water roughly describes the amount of 'lime' or 'limestone' dissolved in the water as calcium carbonate and magnesium carbonate. A 'hard water' having a higher amount of lime (as calcium and magnesium) and a 'soft water' having a lower amount of lime.

The occasional watering of a bonsai with hard water, high in lime content, causes no ill-effect and should not be regarded in itself as bad practice. Nonetheless, over a prolonged period of watering with hard water, the lime content of the water increasingly accumulates in the soil of the bonsai, and in turn, this heightens the pH levels that the bonsai is exposed to. As the majority of tree species prefer a neutral to acidic soil, the alkaline conditions caused by the build up of lime can have serious consequences.

Plants and pH

There are a few notable examples that many of us will be familiar with already as being lime-haters. These are trees that have a strong preference for an acidic soil and include species such as Azalea, Bougainvillea, Camelia, Ilex, many juniper species as well as coniferous species such as Spruce, Larch and Cedar. Prolonged use of hard water will cause lime-induced chlorosis, often identified in lime-haters by the appearance of pale and yellow leaves caused by a deficiency in iron.

Though the majority of shrub and tree species we use for bonsai are tolerant of a reasonably wide pH range, there is a large number of these that

still dislike an alkaline soil (one with a pH higher than neutral or 7.0) caused by the accumulative effects of the lime in hard water. Examples of note that fall into this category include Acer palmatum and Beech, both of which will begin to lose vigour over a couple of years before their health begins to deteriorate.

The Practicalities of Watering Your Bonsai and high pH in Hard Water Areas

At the end of this appendix is a guide to the pH tolerance of many tree species used for bonsai as well as a number of familiar garden plants. The practicalities of regularly measuring the pH balance of the soil of one's bonsai and trying to reach optimum pH levels for the wide range of tree species that many of us own, make the science of soil pH an unwelcome proposition to many of us, myself included.

However the implications of the continued use of hard water on our trees must be addressed or there is a very real possibility of a lack of vigour and deterioration in health of our bonsai.

Watering your bonsai with collected rainwater (which will tend to be very slightly acidic) is an excellent idea and obviously reduces the risk of lime building up in the soil. However, during dry periods, particularly during the summer or when maintaining a large collection of bonsai, watering with rainwater is unfortunately not a practical solution.

In real terms the regular, fortnightly, application of something to reverse the alkalinity of the lime in your bonsai soil is enough to keep your trees healthy. Fortnightly, I use a liquid fertiliser marketed specifically for use with ericaceous or lime-hating plants during the growing season and this is more than sufficient to counteract the effect of hard water on lime-hating species such as Azalea.

For the rest of my bonsai that prefer a neutral to acidic soil, irrespective of the bonsai soil-mix, I use an ericaceous fertiliser OR a mixture of ONE teaspoon of vinegar (the type of which seems irrelevant) with 7 litres of water once a month. Again, this is sufficient to counteract the effects of lime in hard water areas.

While ‘soft’ water which is low in mineral and lime content is excellent for bonsai and can be used without any problem, ‘softened’ hard water contains a high salt content and its use will cause more damage than lime and

lime-scale.

The Use of Vinegar for Cleaning Lime-Scale

The build up of lime deposits, known as lime-scale, on bonsai pots and the nebari of bonsai in hard water areas is very unsightly and the deposits can be very difficult to remove without damage.

However, I have found that the acidity of vinegar is excellent for neutralising the lime without causing damage to tree or pot.

The nebari of my Acer palmatum bonsai covered with a build-up of lime-scale. Removing this thin layer of chalky-white lime is ordinarily very difficult. However the use of a strong solution of vinegar and water (1 part vinegar to 20 parts water) neutralises the lime enough for it to be brushed off with a soft brush (such as a toothbrush). If necessary the vinegar/water mix can be ‘painted’ on and left for a period of time without causing any damage to the roots or the tree itself.

After cleaning the roots of my Acer. Once the lime-scale has been removed it is worth thoroughly flushing the soil with water to dilute and remove the vinegar as, at this strength, it can cause damage to any fine feeder-roots.

Where the foliage of my bonsai has been sprayed with hard tap water, particularly during the heat of summer, the leaves can and will develop a milky-white layer of lime on their surface.

Obviously, cleaning each and every leaf with a vinegar solution would be impractical. A weaker solution of vinegar and water (1 part vinegar to 50 parts water) is sprayed onto the entire foliage mass so each and every leaf is soaked. The soil is then saturated with tap water to flush away any run off of the vinegar/water solution from the leaves. After 5-10 minutes (and before the leaves begin to dry), the foliage mass is then sprayed with clean water to remove the vinegar solution. Though not as cleansing as one would hope for, this technique will remove a lot of lime-scale without causing any discolouration or damage to the leaves.

Cleaning Lime-Scale From Bonsai Pots

Bonsai pots will frequently display a serious build-up of lime-scale in hard-water areas and the method for its removal is straightforward: use 100% vinegar and a soft-brush to break down and remove the deposits of lime, quickly and efficiently. Vinegar will not cause any damage to the pot or its glaze.

The following table indicates ideal or optimum pH ranges of many tree and plant species used for bonsai or found within our gardens. If the pH of the soil is outside of the bonsai's ideal pH range, the tree may simply lack vigour. In other cases the tree can begin to suffer ill health.

A pH of 5.0-6.5 is regarded as acidic, a pH of 6.5-7.5 is regarded as being neutral and a pH of over 7.5 is regarded as alkali.

Acacia 6.5-7.5
Apple 5.0-6.5
Arborvitae 6.0-8.0
Ash 6.0-8.0
Azalea 5.0-6.0
Barberry 6.0-8.0
Beech 6.0-7.0
Birch 5.0-6.0
Bougainvillea 4.5-5.5
Boxwood 6.5-7.5
Camellia 4.0-5.5
Cedar 6.0-7.0
Cherry 6.0-8.0
Cotoneaster 6.0-8.0
Crabapple 6.0-7.5
Cypress, bald 5.0-6.0
Deutzia 6.0-7.5
Dogwood 6.0-7.0
Douglas Fir 6.0-7.0
Eleagnus 6.0-8.0
Elder 6.0-8.0
Elm (Ulmus) 6.0-8.0
Eucalyptus 6.0-8.0
Euonymus 6.0-8.0
Euphorbia 5.5-6.5

Ficus 5.0-6.0
Ficus 5.0-6.0
Fir 5.0-6.0
Firethorn 6.0-8.0
Forsythia 6.0-8.0
Fuschia 6.0-8.0
Gardenia 5.5-6.5
Geranium 7.0-8.0
Ginkgo 6.0-8.0
Grape (Vitas) 6.0-8.0
Hawthorn 6.0-7.5
Hazelnut 6.0-7.0
Hickory 6.5-7.5
Holly (Ilex) 5.0-6.0
Ivy 7.0-8.0
Juniper 5.5-7.5
Lantana 5.5-7.0
Larch 5.5-6.5
Lilac 6.0-8.0
Mimosa 5.0-7.0
Magnolia 5.0-6.0
Maple (Acer) 6.0-8.0
Mountain Laurel (Kalmia) 5.0-8.0
Myrtle 6.5-7.5
Oak (Quercus) 5.0-7.0
Oleander 6.0-7.5
Orange 5.0-7.0
Oxalis 6.0-8.0
Pine (Pinus) 5.0-6.0
Podocarpus 5.0-6.5
Pomegranate 5.5-6.5
Poplar 6.0-8.0
Privet (Ligustrum) 6.0-8.0
Prunus 6.0-8.0
Quince 6.0-7.5
Redbud 6.0-8.0

Rhododendron 5.0-6.0
Rose 6.0-8.0
Rosemary 5.0-6.0
Sage 6.0-8.0
Spirea 6.0-8.0
Spruce (Picea) 5.0-6.0
Sumac 6.0-8.0
Sweet Gum 6.0-7.0
Tamarix 6.0-8.0
Tuliptree 6.0-7.0
Viburnum 6.0-8.0
Willow (Salix) 6.0-8.0
Wisteria 6.0-8.0
Witch Hazel 6.0-7.0
Yew (Taxus) 5.5-7.0

Appendix 6:

Glossary

ADVENTITIOUS BUD A bud that occurs in an unusual place on a tree.

APEX The highest point of the tree, this can be a single branch or can consist of a series of small branches. Also described as the 'Crown'

APICAL Growth produced by a plant which is most vigorous, in the majority of species this at the furthest points of the plant from the rootsystem (upper and outermost branches).

BACKBUDDING Process by which apical growth is pruned to induce growth further back along the branch or trunk.

BASAL DOMINANCE Used to describe plant species where the lowest growth is strongest and most vigorous; the opposite of apical dominance.

BUDBREAK The point at which a bud has opened enough to show a green tip.

BUDBURST The point at which a buds contents unfurl (the new leaves appear).

BUD EXTENSION The point before Budbreak where the tiny buds that have been on the branch since the previous year begin to swell and extend.

BLEED To weep sap.

BRANCHES The Primary branches are those that grow directly from the trunk; the Secondary branches are those that grow directly from the primary branches, the Tertiary branches grow from the secondary branches.

BROAD-LEAVED/CONIFEROUS Conifers belong to the group of naked-seeded plants known as gymnosperms, their seeds are not enclosed in an ovary. Conifers have leaves which are needle-shaped or scale-like. With a few notable exceptions they are evergreen. Broad-leaved trees are a much larger group belonging to the angiosperms or flowering plants which have seeds enclosed in an ovary. The majority are deciduous and go dormant in Autumn through to Spring.

BUD Organ or shoot that contains an embryonic branch, leaf or flower.

BUTTRESSING This is also known as root-flare, where the base of the tree flares outwards givingthe feeling of great age and solidity.

CAMBIUM Green growth tissue directly below the bark, its increase adds to the girth of roots and stems.

CALLUS Tissue that forms over a wound on a branch or trunk as part of the healing process.

CANDLE Name given to the extending bud of a Pine before the new needles open.

CHLOROSIS Loss of chlorophyll and leaf colour as a result of mineral deficiency.

CHOP Commonly used word that describes the heavy pruning and reduction in height of the trunk of a tree.

COMMON NAME Simply the name a plant is commonly known by, however, common names can be very non-specific ('Maple' could refer to any one of hundreds of trees) and can vary from region to region. It is always better to try to remember a trees' specific Latin name as this nomenclature is specific to each and every plant, the world over.

CULTIVAR A cultivated variety of a species i.e. Acer palmatum 'Bloodgood' or Acer palmatum 'Deshojo' are both Acer palmatum cultivars or varieties.

CROWN The highest point of the tree, this can be a single branch or can consist of a series of small branches. Also known as the apex.

DESSICATION Lack of water; desiccated leaves usually occur when the roots are unable to supply water to them.

DECIDUOUS A plant that sheds its leaves each year in Autumn- this can be a broad-leaved or a coniferous tree.

DEFOLIATION The process of partly or completely removing the leaves of a tree during its summer dormant period to induce a crop of finer, smaller leaves which can greatly increase ramification.

DIEBACK Death of growth beginning at the branch tips from disease or injury.

DISSECTED Deeply cut into segments or lobes.

ERICACEOUS A term referring to acid loving, lime-hating plants.

EVERGREEN A plant that remains in leaf all year. It should be noted that evergreen trees slowly shed their oldest leaves at certain times of the year (depending on species) as they are replaced by new growth.

FORM Used to categorise a bonsai using its most conspicuous aspect; this can be according to its trunk direction (formal or informal upright, slanting, cascade etc) or its number of crowns (single trunk, multi-trunk or group) for instance. see notes on forms.

GENUS The name given to a group of plants that have a common feature- the first part of a plants Latin name i.e. ACER palmatum.

INCH Imperial Measurement replaced by metric nearly 40 years ago but still in use today in some countries. One inch (1”) equals approximately 2.5cm, or, just under a typical man’s thumb width.

INTERNODE Section of growth between two nodes (leaves or leaf-joints).

JIN A deadwood effect on a bonsai- can be either an old branch or a protruding part of the trunk. Jins can be found naturally occurring on old collected trees though are more often than not, artificially created from unwanted branches.

LAYERING Ground and airlayering are methods of producing new roots from the trunk or branches of a tree; often used as a propagation method but also useful for correcting poor surface rots (nebari).

LITERATI A bonsai form where the tree has a tall, slender trunk with no lower branches and only sparse foliage confined to the upper reaches of the tree.

MAME Name given to bonsai less than 15cm/6 inches in height.

NEBARI Commonly-used Japanese term to describe the surface roots of a bonsai (those that can been seen on or above the surface of the soil).

NODE Growth point on a branch or trunk from which leaves, leaf buds and shoots can arise.

OVERWATERING Where a tree growing in poor-draining soil is given water too frequently (the soil does not begin to dry out before more water is applied). This decreases even further the amount of air available to the roots

caused by the poorly drained soil. Eventually leads to dead roots and root rot.

PEAT Inorganic bonsai soil component that has rightly fallen from favour amongst bonsai enthusiasts.

POTENSAI 'Potential bonsai'.

RAMIFICATION The repeated division of branches into secondary branches.

REPOTTING Moving a tree into a new pot or container. It does not necessarily require root pruning or any interference with the roots that requires correct seasonal timing.

ROOTPRUNING Pruning of or reduction of the root system.

SHARI Deadwood on the trunk of a bonsai (as opposed to Jin which is a deadwood branch or protrusion).

SOIL In the context of bonsai, soil does not refer to the soil found in the ground but specialist bonsai soils used for growing bonsai. Organic soils are those that contain ingredients derived from plants; peat, bark or leaf litter. Inorganic soils contain inert materials, mineral, stone or hardened/fired clays such as grit, sand, akadama or turface.

SPECIES The subdivision of Genus; the second name in Latin nomenclature i.e. Acer PALMATUM.

SPHAGNUM MOSS Generic/general name given to long-fibred moss, used as a soil component for bonsai and airlayering. Sphagnum Moss Peat is rotted and broken down Sphagnum Moss and does not have the same positive properties for bonsai or layering.

SHOHIN bonsai up to 12"/30cm in height

STYLE The style of a tree has previously been used to describe the main direction the trunk of a tree takes, this should be correctly referred to as the FORM. The style of the tree describes the way a bonsai has been shaped to create an image of its fully grown counterpart; this can be in a contemporary or a classical style, an impressionistic or an expressionistic style.

SYNONYM An alternative Latin name for a plant, usually an old or invalid classification.

TAPER The gradual thinning or narrowing from one end of the trunk or branch to another.

TREE Commonly bonsai growers will refer to their bonsai as trees rather than as bonsai.

URO A carved (or natural) deadwood hollow, often seen on (but not limited to) deciduous trees.

UNDER-WATERING Where a tree is allowed to dry out or is not watered thoroughly when required.

VARIETY The sub-division of Species ; the third name in Latin nomenclature i.e. Acer palmatum 'DESHOJO'.

XYLEM Area below cambium in the trunk.

YAMADORI Trees collected from the wild for the use as bonsai. Originally used to describe wild trees collected from mountainous regions.

Bonsai Inspirations 2

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Bonsai Basics

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