INTRODUCTION

TO

BONSAI

A

COURSE

SYLLABUS

By: Thomas L. Zane

TABLE OF CONTENTS

SECTION NUMBER	SUBJECT MATTER	PAGE
	Table of Contents	i
	List of Illustrations	ii through iii
	Preface	iv through v
1.	Introduction	1-1 through 1-5
2.	Bonsai Styles	2-1 through 2-7
3.	Bonsai Tools	3-1 through 3-2
4.	Pruning	4-1 through 4-7
5.	Wiring	5-1 through 5-8
6.	Styling the Tree	6-1 through 6-8
7.	Selecting a Container	7-1 through 7-4
8.	Soil	8-1 through 8-3
9.	Potting	9-1 through 9-6
10.	Care and Maintenance	10-1 through 10-10
11.	Selecting Nursery Stock	11-1 through 11-4
	Appendices	
	A. Bonsai Tools	A-1 through A-2
	B. Bonsai Bench Construction	B-1 through B-2
	C. Bonsai Record	C-1

LIST OF ILLUSTRATIONS

Illustration Number	Description	Page Number
1-1	Scalene triangle	1-3
1-2	Triangle from front of tree	1-3
1-3	Triangle from top of tree	1-3
1-4	Triangle from top of branch	1-3
1-5	Triangle from side of branch	1-4
1-6	Rule of thirds	1-4
2-1	Formal upright style	2-1
2-2	Informal upright style	2-1
2-3	Slanting style	2-2
2-4	Semi-cascade style	2-2
2-5	Cascade style	2-2
2-6	Roots-over-rock style	2-3
2-7	Roots-on-rock style	2-3
2-8	Broom style	2-3
2-9	Windswept style	2-4
2-10	Twin trunk style	2-4
2-11	Triple trunk style	2-4
2-12	Clump style	2-5
2-13	Twin trees style	2-5
2-14	Group style	2-5
2-15	Bunjin or literati style	2-6
2-16	Saikei style	2-6
2-17	Mame bonsai style	2-6
4-1	Plant trunk parts	4-1
4-2	Plant branch parts	4-2
4-3	Auxin flow	4-3
4-4	Pruning by thinning	4-3
4-5	Pruning by heading back	4-4
4-6	Pruning to downward node	4-5
4-7	Maximizing branch growth	4-5
4-8	A concave cut	4-6
4-9	An angled cut	4-6
4-10	Pruning by breaking	4-6
4-11	Grow and Clip method	4-7
5-1	Wiring angle	5-3
5-2	Anchoring wire in soil	5-3
5-3	Anchoring wire by girdling	5-3
5-4	Anchoring wire on trunk	5-4
5-5	Anchoring wire with a hood	5-4
5-6	One wire for two branches	5-4
5-7	Splicing wire	5-5
5-8	Doubling wire	5-5
5-9	Crossed wires	5-6
5-10	Wiring to twist a branch	5-6

LIST OF ILLUSTRATIONS, Continued

5-11	Wiring a trunk to be curved	5-7
5-12	Wiring downward droop	5-7
6-1	Rule of thirds	6-1
6-2	Location of surface roots	6-2
6-3	Severely drooping branches	6-3
6-4	"T" or "Bar" branches	6-3
6-5	Pigeon breast	6-5
6-6	Reverse pigeon breast	6-5
6-7	Flow and visual movement	6-5
6-8	Creating new apex	6-6
6-9	Refinement of new apex	6-6
6-10	Incorrect new apex	6-7
9-1	Pot drain cover wires	9-2
9-2	Tree in center of pot	9-3
9-3	Tree offset in pot	9-3
9-4	Offsetting based on long branch	9-4
10-1	Display stand	10-8

PREFACE

The principal use of this syllabus, Introduction to Bonsai - A Course Syllabus, is as a workbook to accompany hands-on learning sessions for the beginning student in bonsai. Instruction is in the basic artistic, mechanical and horticultural skills necessary for the creation and maintenance of a bonsai. During most of the instruction the student should have his tree, which is soon to become a bonsai, on a table before him.

Various exercises will be conducted during which the student will have the opportunity to learn to make pruning cuts, to wire branches, and to bend the branches without breaking them. All this will be done before attempting to apply these new skills to the bonsai-to-be. Once proficiency in the mechanical techniques has been demonstrated, then and only then, will they be tried on the tree.

There are various audio-visual presentations which may be used to supplement this text to reinforce the student's understanding of the classroom discussions, demonstrations, and exercises. The audio-visual materials include but are not limited to the following:

Brooklyn Botanic Garden film: Bonsai: The Art of Training Dwarfed Potted Trees.

Bonsai Clubs International Slide/Tape Program #4, How to Select a Container.

Bonsai Clubs International Slide/Tape Program #12, Introduction to Bonsai, written and produced by the author.

Bonsai Clubs International Slide/Tape Program #25, Wiring Bonsai, produced by the author.

Bonsai Clubs International Video Tape #1, Designing A Bonsai, produced by the author.

Specific credit for materials in this text include:

The drawings of Bonsai styles, Illustrations 2-1 through 2-10, 2-15, and 2-16 in Section 2, were created by Norman Haddrick and are reproduced with his permission.

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The group planting drawing, Illustration 2-14, Section 2, is the club logo of the Hillsborough Bonsai Society of San Mateo, California and is reproduced with their permission.

The plant structure diagram, Illustration 4-1, Section 4, appeared in the American Bonsai Society's Bonsai Journal, Vol. 20, No. 2, and is reproduced with permission from the American Bonsai Society.

The information in Section 10 and in APPENDIX B concerning construction of the outdoor bonsai bench was provided by Teri Ringo and Craig Kosinski and is included with their permission.

All other information is this syllabus was acquired over a period of years of studying, learning, teaching and practicing bonsai.

My thanks go to my many teachers, to fellow members of the Kawa Bonsai Society in the Daytona Beach area, to friends in the Bonsai Societies of Florida, and to other friends who have so willingly shared their time and talents. Special mention is due the late James Earl "Nick" Carter who during his lifetime so unselfishly, generously and patiently nurtured the seed of bonsai in so very many fortunate people.

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SECTION 1

INTRODUCTION

I. OBJECTIVES

NOTES

As a result of studying this section of the syllabus and viewing either the audio visual presentation or a live plant exhibition, the student will be able to:

1. Define the meaning of "bonsai".

2. Identify various sources of bonsai material.

3. Briefly explain the history of bonsai as it developed in the Far East and in America.

4. Describe several design considerations in the art of bonsai and identify their presence in specimens provided.

II. GENERAL

A. The Bonsai Clubs International slide/tape program number 12 titled, "Introduction to Bonsai" may be shown at this time. This section of the syllabus closely parallels the first half of the AV program

B. Bonsai is a living art form which requires a consistent application of horticultural practices to maintain its health and form.

C. "Bonsai" is pronounced "bone-sigh".

D. Literal translation is "tree in a tray".

III. SOURCES OF BONSAI

Bonsai, or material to be made into bonsai, are obtained from a variety of sources including but not limited to:

1. Collecting in the wild

2. Purchasing nursery stock

3. Air-layering

4. Grafting

Taken seedlin
to dwarf tre

open rocky
where nature
miniaturized

Azaleas,

NOTES
Brussel
Martin Bon
Nursery -
Memphis

5. Rooting cuttings

6. Seeds, and

7. Buying a "finished" bonsai from a nursery or private source.

IV. HISTORY OF BONSAI

A. History of bonsai is traceable to ancient China. Concept of miniature trees in pots was transported to Japan from China in about the 12th Century, A.D.

B. Japanese were first to actively cultivate bonsai. Others before them had only collected miniature specimens from the wild. It was the Japanese who developed the art of creating miniature trees and they codified various rules governing the art of bonsai.

C. Bonsai was not seen outside of the Far East until the 20th Century. The art of bonsai did not come to America until after the Second World War.

D. Bonsai in America flourished first in California and slowly began to spread eastward.

V. BASIC DESIGN CONSIDERATIONS

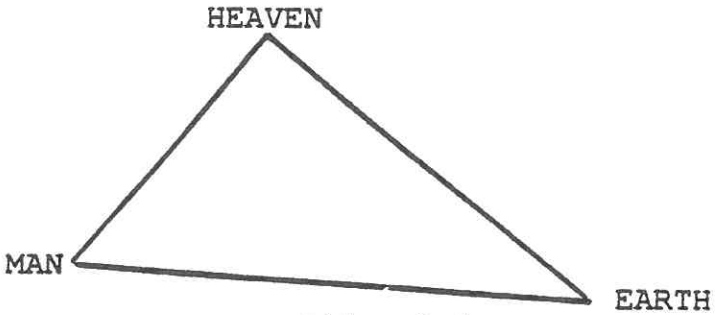
A. Bonsai is an art of illusion.

It creates an illusion of age, mass and weight by:

a. Having surface-clinging roots.
b. Using a tapering trunk which is bare to well above ground.
c. Having the heaviest branch be the lowest branch on the tree.
d. Training most branches into a horizontal or drooping position rather than upright.
e. Eliminating all downward-growing foliage and controlling upward-growing foliage.
f. Insuring the correct environment for the tree.

B. Use of Scalene Triangle

1. The tree is in the form of a scalene triangle - one in which no two sides are equal. Oriental philosophy often equates the scalene triangle to Heaven, Man and Earth.

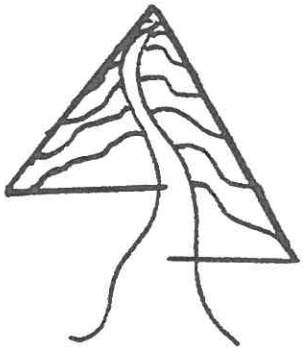


Illus 1-1

NOTES

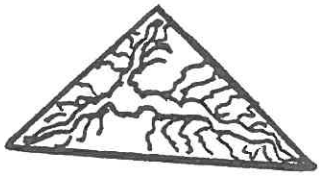
Will find △ in every tree

2. This may be seen from front of tree:



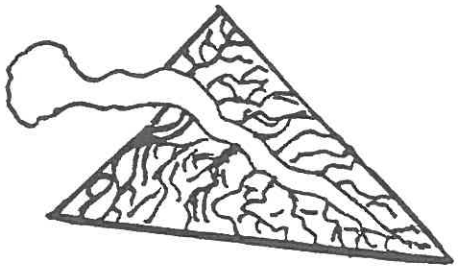
Illus. 1-2.

3. From top of tree:



Illus. 1-3

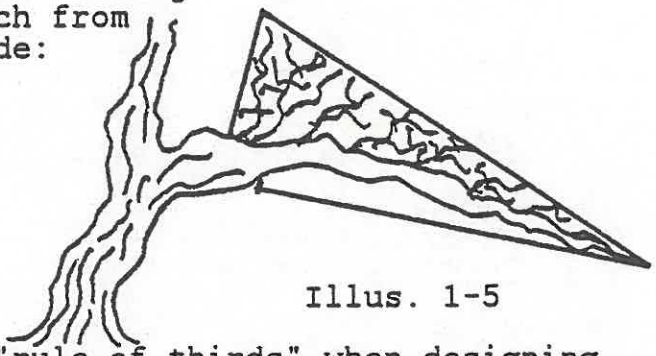
4. From top of a branch:



Illus. 1-4

NOTES

5. Or, when viewing a branch from the side:



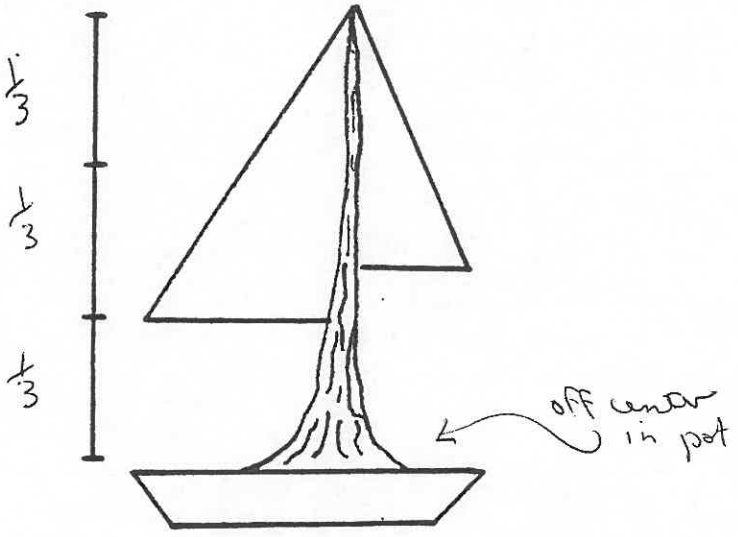
Illus. 1-5

C. Use of the "rule of thirds" when designing bonsai.

1. Lower third of tree has open trunk, no branches, and surface-clinging roots.

2. Middle third of tree emphasizes branch structure with some openings to view trunk.

3. Top third of tree is devoted to branchlets and apex.



in Round pot you plant in center all other pots plant off-center.

Illus. 1-6

4. Position of tree in container is part of the "rule of thirds".

a. Tree is placed off-center to left or right.

b. And off-center to the rear.

VI. SUMMARY

NOTES

A. The term "bonsai" means a tree in a tray and is pronounced, "bone-sigh".

B. Sources of material suitable for bonsai are many including gathering material in the wild, propagating, and purchasing from nurseries.

C. Concept of miniaturizing trees originated in Far East, was perfected in Japan, and has been practiced in America since about 1946.

D. Some basic considerations when designing a bonsai include:

1. The creation of a miniaturized version of a tree by the art of illusion.

2. Striving for asymmetry by using the scalene triangle in the overall design of the tree and in the design of individual branches.

3. The rule of thirds which is concerned with the proportions of the tree, of its individual parts, and of its relationship with the container.

SECTION 2

BONSAI STYLES

I. OBJECTIVES

NOTES

As a result of studying this section of the syllabus and viewing either the audio visual presentation or a live plant exhibition, the student will be able to:

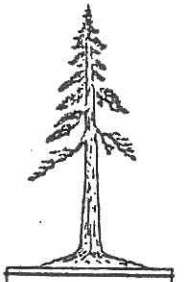
1. Identify five basic classical forms of bonsai.

2. Discuss the many variations of basic styles which are used in bonsai.

II. THE FIVE BASIC CLASSICAL STYLES OF BONSAI

A. The Bonsai Clubs International slide/tape program number 12 titled, "Introduction to Bonsai" may be continued now. This section of the syllabus closely parallels the second half of the AV program.

B. Formal Upright style has a straight, erect trunk from base to apex.



Illus. 2-1

1st Branch approx ⅓ from bottom of tree ideally next limb would be on back

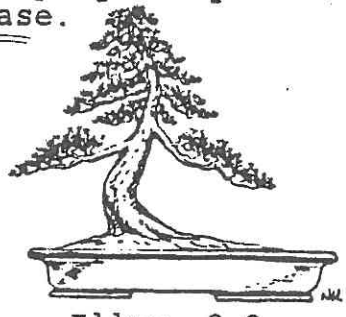
C. Informal Upright style has a curved trunk with apex over base.

[Never have back limb or first limb

1st Rule to be broken

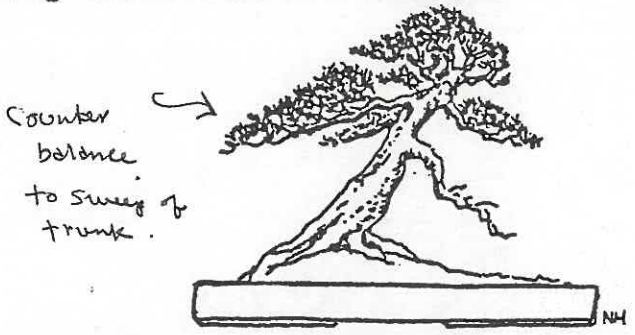
2nd limbs facing at 45° ∠

See Valeriani notes



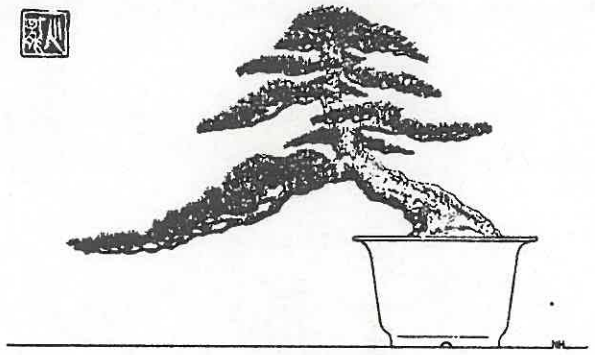
Illus. 2-2

D. Slanting style has either a straight or curved trunk leaning to left or right with apex generally above rim of container.



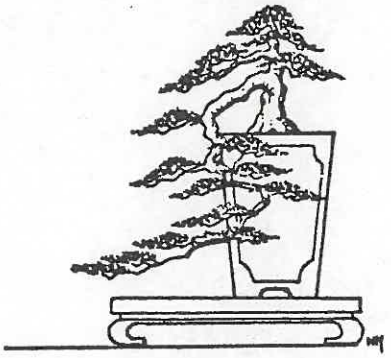
Illus. 2-3

E. Semi-cascade style has a trunk which grows up and out at a considerable angle and tip of cascade which is between rim and feet of container.



Illus. 2-4

F. Cascade style bonsai has a trunk which bends sharply down, and the tip of the cascade is below the feet of the container.



Illus. 2-5

NOTES

Always looking for △

Sign of weakness tree should never touch edge of pot.

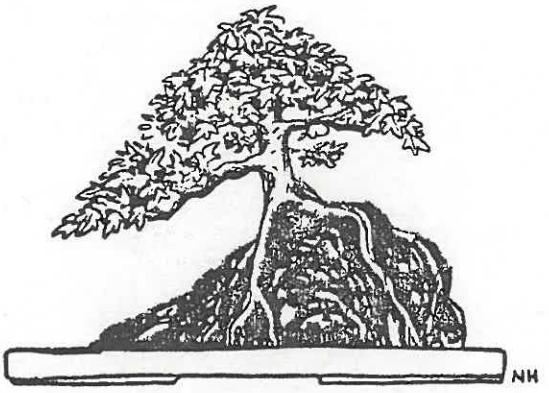
In Square pot Cascade comes off Corner of P

III. VARIATIONS OF STYLE

NOTES

A. Roots-Over-Rock.

This style has roots which wrap around and grow down a rock into the soil.



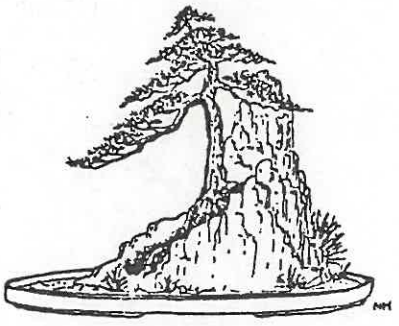
Illus. 2-6

Crepe myrtle
Amer Elm.

top and hollow out trunk to create broom effect

B. Roots-On-Rock

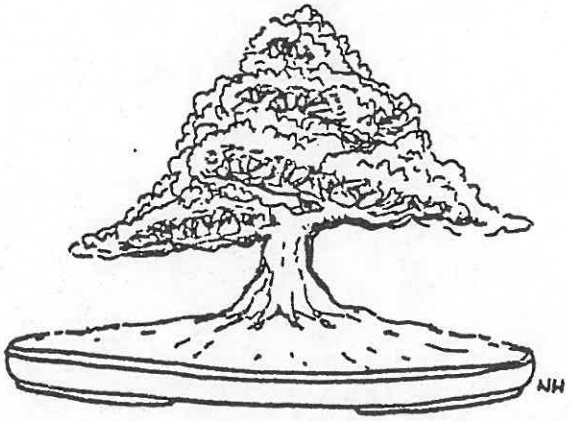
The root ball is planted in a pocket in a rock or is planted on a rock slab.



Illus. 2.7

C. Broom Style.

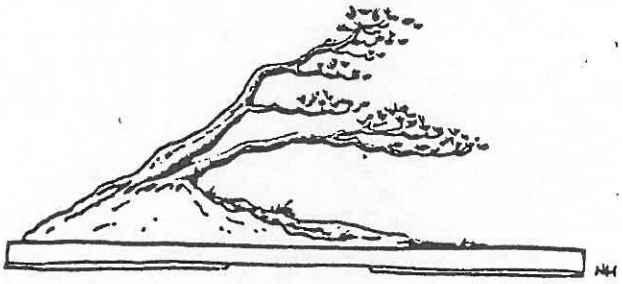
Has a straight, short trunk with the appearance of an upside-down broom.



Illus. 2-8

NOTES

D. Windswept bonsai style has most of its limbs slanting in same direction.



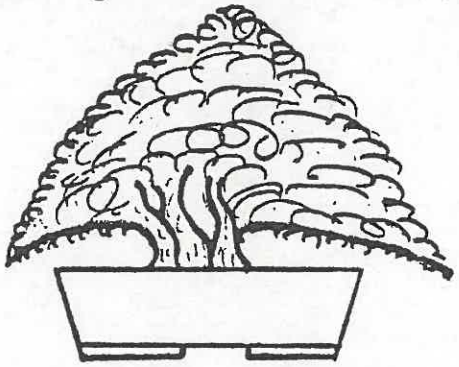
Illus. 2-9

E. Twin Trunk. Single root system from which two trunks grow. Trees must vary in size.



Illus. 2-10

F. Triple Trunk. A single root system from which three trunks grow. Trees must vary in size.

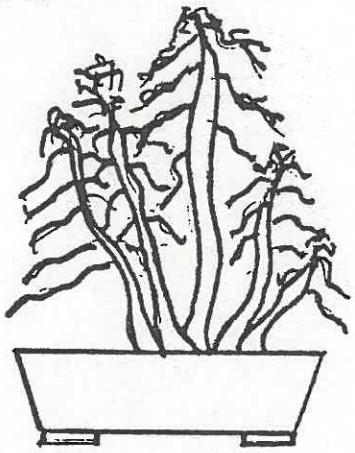


Illus. 2-11

NOTES

G. Clump style.

One root system, more than three trees but of an uneven number. Trees must vary in size.



Illus. 2-12

H. Raft style. Trunk of the tree is planted on its side. Roots grow into soil from trunk and branches become individual trees.

I. Twin Trees.

Two separate trees, usually of same specie, which vary in size.

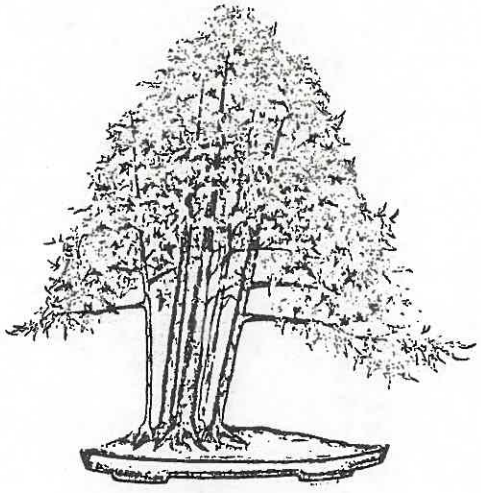


Illus. 2-13

2 - 3 - 5 - 7 - 9.
Only even #

J. Group style or forest planting.

Group or forest has uneven number of trees, usually of same style and specie, with variation in size.



Illus. 2-14

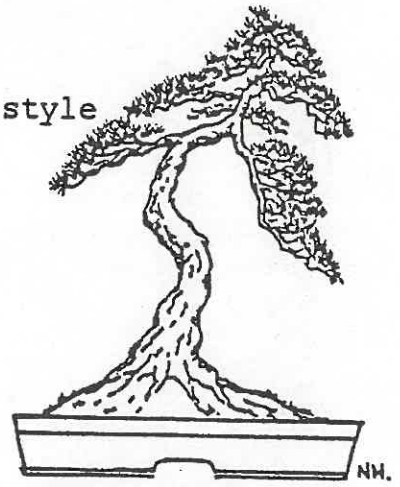
K. Miscellaneous styles.

NOTES

1. Bunjin or literati style

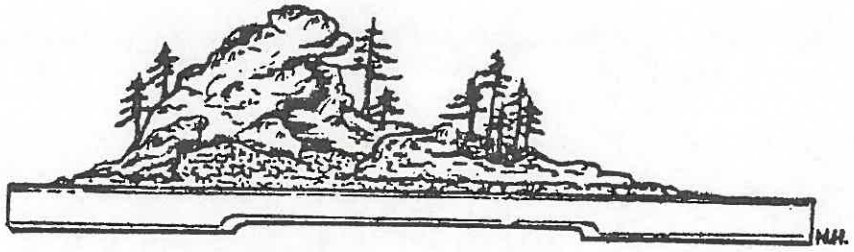
Looks like the stylized trees in some Chinese paintings or Japanese woodblock prints. They have slender and strangely bent trunks with sparse foliage.

2/3 trunk & top



Illus. 2-15

2. Saikei. A grouping of plants and rocks to form a landscaped scene.



Illus. 2-16

3. Mame bonsai are any bonsai under six inches tall.



Illus. 2-17

4. Grasses, bamboo, chrysanthemum and other companion plantings.

IV. SUMMARY

NOTES

A. The five basic classical styles of bonsai include the upright style and several variations. Variations include the informal upright, slanting, semi-cascade and cascade styles.

B. There are many variations of these basic classical styles including: roots-over-rock, roots-on-rock, broom, windswept, twin and triple trunk, clump, raft, twin tree and group planting, bunjin, saikei and mame bonsai.

SECTION 3

BONSAI TOOLS

I. OBJECTIVES

As a result of studying this section of the syllabus and participating in classroom exercises the student will be able to:

1. Identify basic tools used in bonsai and know their purpose.

2. Demonstrate proper use of basic bonsai tools.

3. Maintain tools in optimum condition.

II. BASIC BONSAI TOOLS

A. While nearly any type of gardening tool may be used in creating and maintaining bonsai, there are specialized tools available which are better suited for working on bonsai.

B. The basic bonsai tools are shears, concave cutter and wire cutter.

C. A descriptive listing of the most commonly used bonsai tools is attached as an APPENDIX to this syllabus.

D. A tool is no better than its maker. When selecting tools, get the best quality tool which can be afforded.

E. The condition in which a tool remains is directly dependent on how well it is maintained by its user. Following are some maintenance hints:

1. Never use a tool for a purpose for which it was not designed.

2. Never twist or turn a cutting type tool as it is being used.

3. Try not to drop a tool.

4. Sharpening of tools should be done only by a specialist.

NOTES

Masakuni.
tool maker

* Concave cutter must have #16
- Pruning shear
- wire cutter
- Root Hook
  3prong is best.
  1 prong OK.
- Some version of "Chop stick" used to prevent air pockets in soil.
  air pockets = root rot.
- ~~Jinning tool~~.
  Jinning tool
- Saw

Small trowel



3000 RPM Dremel

~~Sifter~~ for soil

5. When finished using a tool, NOTES
   a. Clean with water or alcohol to remove all sap.
   b. Apply light coat of oil to all cutting surfaces.
   c. Store in a dry place.

III. SUMMARY

A. The basic bonsai tools are the shears, concave cutter and wire cutter.

B. A quality made tool is well worth the extra initial cost.

C. Using and maintaining a tool properly will prolong its life.

SECTION 4

PRUNING

I. OBJECTIVES

As a result of studying this section of the syllabus and participating in classroom exercises the student will be able to:

1. Describe the various parts of a plant.

2. Describe three types of pruning.

3. Explain the basic plant growth action which is affected by pruning.

4. Explain the effect of light on growth and how growth can be influenced by pruning.

5. Demonstrate proper methods of pruning.

NOTES

Without cutting
Can't develop tree
Don't waste
time by not
cutting

July 15th
Cut off date
on Azaleas

II. IDENTIFICATION OF PLANT PARTS

A. Trunk.

1. Main supporting line of a tree.

2. Constructed of series of cells which are in concentric circles or layers:

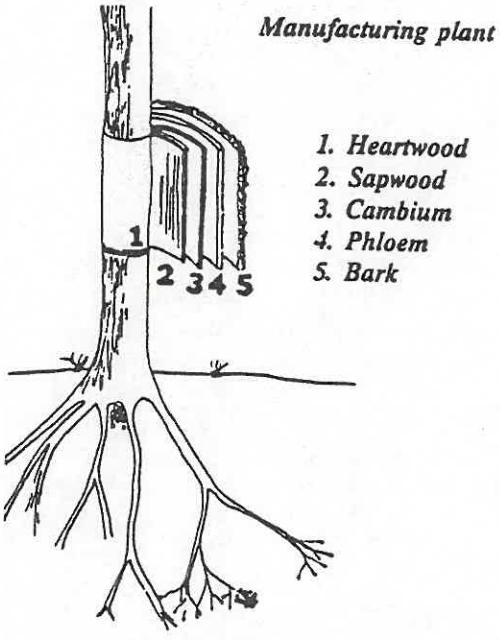
a. Heartwood is composed of dead cells.

b. Xylem or sapwood provides firmness and transports moisture from roots to leaves.

c. Cambium is tissue from which new wood and bark develops.

d. Phloem transports food material made in leaves to other parts of plant.

e. Bark is hard outer layer that insulates tree from both temperature extremes and protects it from injury.



Illus. 4-1

NOTES

B. Branch. A secondary trunk or arm.

1. Primary branches grow from trunk.

2. Secondary branches grow from primary branches.

3. Tertiary, quaternary, etc., branches grow in sequence from earlier branches.

C. Roots. Extensions of trunk(s) or branches which grow underground.

1. Anchor tree to soil.

2. Take-up fluids from soil.

D. The apex is the upper tip of tree.

E. An apical bud is the terminal bud on trunk.

F. Axillary buds are buds which stand ready to replace the leaf or branch near where it grows.

G. A blade is flat portion of leaf.

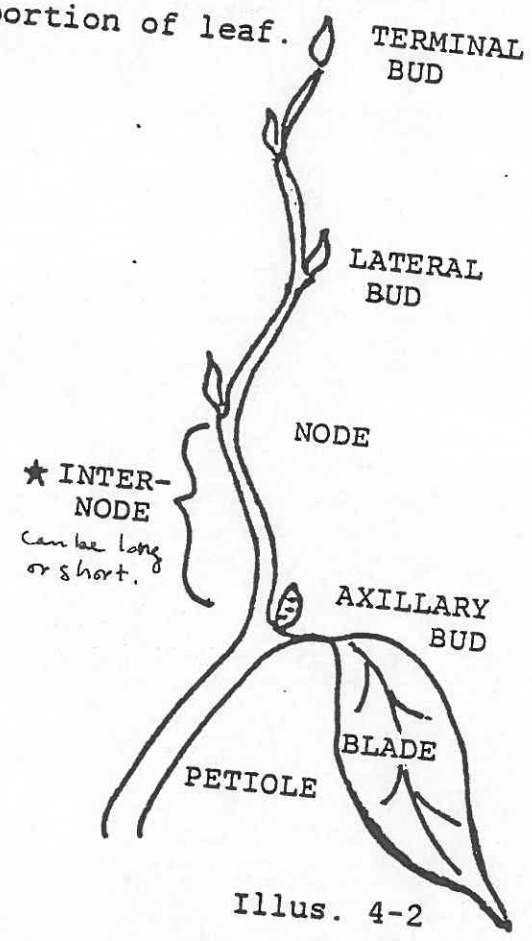
H. Internode is distance on trunk or branch between nodes.

I. A latent bud is dormant bud under bark.

J. A node is a joint on trunk or branch where growth begins. There are leaf nodes which produce leaves and flower or fruit nodes which produce flowers and fruit.

K. A petiole is the stem of the leaf blade.

L. A terminal bud is growth tip on trunk or branch.



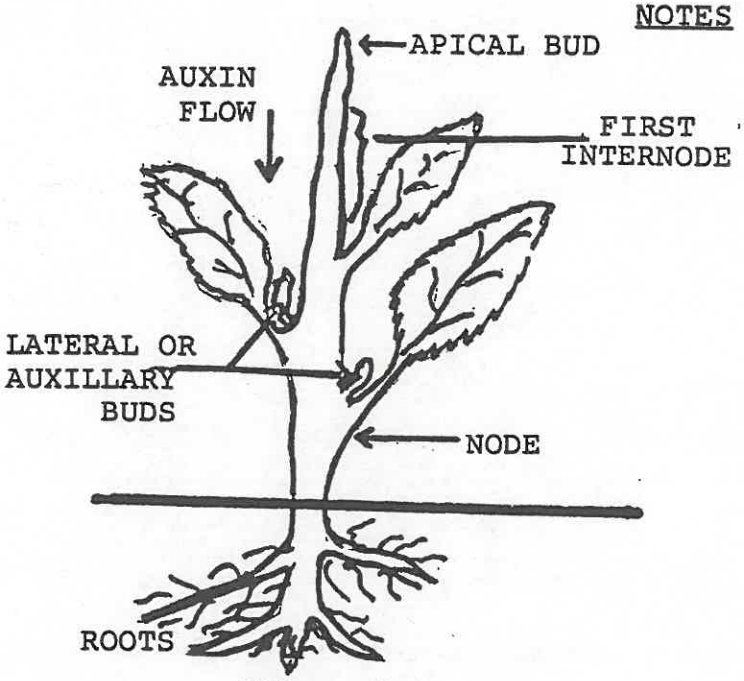
Illus. 4-2

M. Auxins are:

1. Growth regulating hormones produced at apical tips and at branch tips where cells actively divide.

2. Auxins flow into the stem, lengthening the first internode and move down to stimulate formation of lateral buds and the growth of roots.

NOTES



Illus. 4-3

III. PRUNING TECHNIQUES

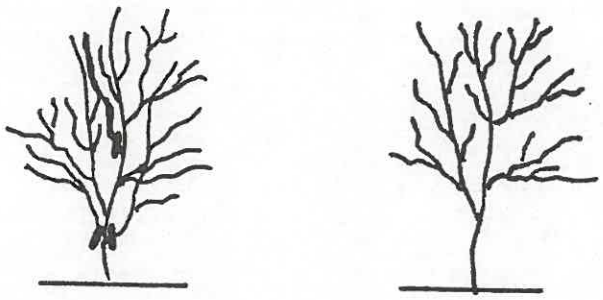
A. Thinning is removal of:

1. An entire branch back to a larger branch or trunk.

2. Growth which surrounds the immediate area where a branch grows from trunk.

3. Growth along the first half-inch of each branch at its thick end.

Pines: cut flush.
Leaf bearing: use concave

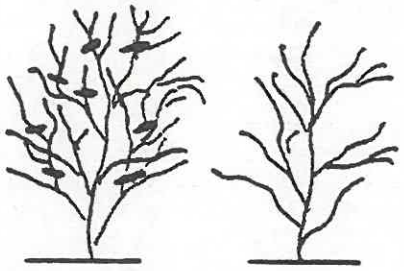


Illus. 4-4

B. Heading back is: Very important

NOTES

Cutting back or shortening of branches to maintain overall shape and size of plant.



Illus. 4-5

C. Pinching is:

1. Heading back to reduce overall size.

2. Done with finger tips on soft new growth. It leaves no scars or leaf-browning.

D. Summary. The structure of the plant is created and maintained by pruning.

IV. PRUNING AND PRINCIPLES OF PLANT GROWTH

A. Wounding

try bending when you haven't watered it.

1. Wounding is done by:
   a. Pruning and by
   b. Bending a branch

2. Stimulates the cambium to thicken and to heal the wound.

3. Removal of terminal bud causes food to be diverted to other active buds causing ramification.

B. Light, pruning and plant growth.

1. Importance of light to a growing plant
   a. Photosynthesis converts light to food.
   b. Light draws plant growth.
   c. Apex of tree or terminal branch bud will grow the most rapidly and needs the most pruning to keep it in proportion to rest of tree. ★

2. If amount of growth on one side of a tree is weaker than another side:

a. Face weaker side towards major light source.

b. Keep strong side headed back.

3. When shortening a side branch, cut back to a downward growing node:

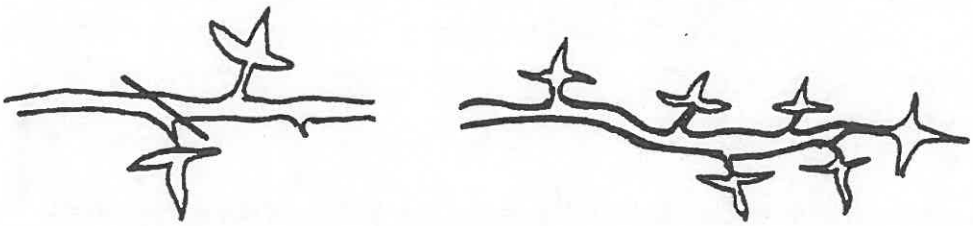
a. To enhance the branch's downward slope.

b. Sunlight will moderate the amount of downward slope.

NOTES

Flowers, Fruit & seeds require food. Cut them off and energy goes somewhere else.

Azalea big on bottom little on top - Take flowers off top leave on bottom food will go to upper limbs.



Illus. 4-6

4. Trunks and branches increase diameter in direct proportion to amount of foliage being supported.

a. The more healthy foliage that exists, the faster the trunk will thicken.

b. To thicken a branch:

(1) Avoid pruning.

(2) Place it towards light.

c. To maximize growth, wire tip of branch upward to convert terminal bud to an apical bud.

d. To slow branch growth:

(1) Keep it headed back.

(2) Turn it away from the main light source.

Example of a tree set to maximize growth of a particular branch.



Illus. 4-7

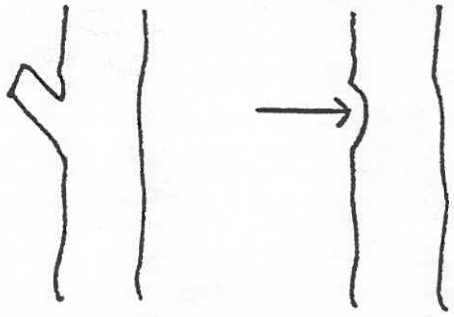
NOTES

5. Flowers, fruit and seeds use food. To maximize branch and foliage growth, remove flowers, fruit and seeds.

6. Foliage growth and root growth must be kept in balance with each other.

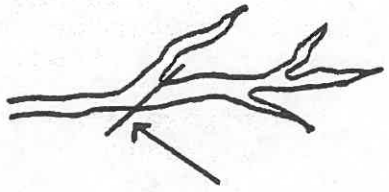
C. The mechanics of pruning.

1. A concave cut
   a. Made with a concave pruning tool.
   b. Example of cutting a branch from a trunk:



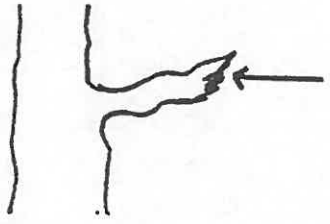
Illus. 4-8

2. A flush and angled cut:
   a. Shortening a branch.
   b. Angle of cut is parallel with continuation of branch line.



Illus. 4-9

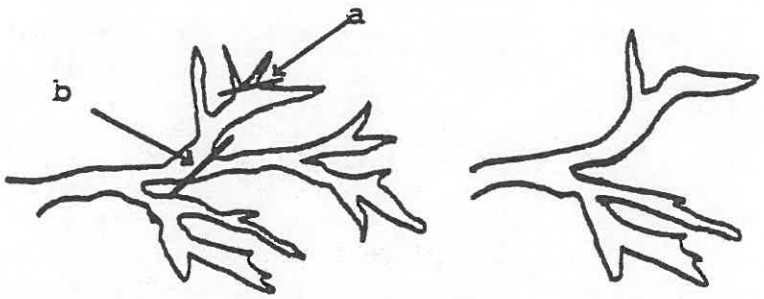
3. Breaking or tearing. Done to give the appearance of natural break.



Illus. 4-10

4. Shaping by pruning:
   a. The "grow and clip" method.
   b. Pruning cuts made at "a" and "b" will change direction of growth of branch.

NOTES



Down & up growing limbs we trim - they will die in nature anyway

Illus. 4-11

5. Application of wound dressing.

V. SUMMARY

A. The plant is composed of various parts, each having a specific function and each a part of a complex system.

B. Pruning is done to thin growth or to head growth back.

C. The growth pattern in the plant may be altered by various techniques other than the obvious removal of foliage.

D. Light is the main external agent acting upon the plant. Coordinating pruning with variations in available light can have a significant influence on growth patterns.

Leaf pruning - fertilize 10-14 days prior.

July best month tree must be healthy. Vigorous in growth.

Pines: Cut candles off - pull top and to store

Don't do 2 years in a row

Pines
Strong in spring
cut candles in June
they will come back.

SECTION 5

WIRING

I. OBJECTIVES

NOTES

As a result of studying this section of the syllabus and participating in classroom exercises the student will be able to:

1. Identify the two types of wire used in training bonsai.

2. Select the proper size wire to be used on a particular branch.

3. Correctly apply wire to a tree trunk or branch.

4. Demonstrate the proper bending of a wired tree branch.

II. PURPOSE OF WIRING

A. Wiring is used as one means of training a branch or trunk to grow in shape or direction desired.

B. Wire is applied to a branch to be trained and the *wire* is bent and the branch will follow. Bending wounds the cambium layer of the branch which heals. New wood is formed. When the wire is removed, the branch retains its new shape.

III. TYPES AND SIZES OF WIRE

A. Types of wire used with bonsai.

1. Copper wire
   a. Relatively easy to apply.
   b. Difficult to remove.
      (1) When bent, its molecular structure changes, becoming more rigid.
      (2) Holds the bent branch with little effort.
   c. To soften copper wire for reuse:
      (1) Straighten wire.
      (2) Heat wire at about 750o for at least thirty minutes. Heating again changes the molecular structure, making it more pliable.

NOTES

2. Aluminum wire.
   a. It may be silver colored or it may be anodized.
   b. Is easy to apply and remove.
   c. Do not heat. Simply straighten and reuse.

B. Sizes of wire.

1. Copper wire is measured by gauge.

2. Aluminum is measured in millimeters.

3. Diameter of wire to use on a tree:
   a. Copper wire: one-third of branch diameter.
   b. Aluminum wire: one-half of branch diameter.

4. Two pieces of smaller diameter wire may be used instead of a single heavy wire.

C. Length of the wire should be about one-third longer than the area onto which it will be applied.

IV. WIRING TECHNIQUES

A. When to wire

1. Season.
   a. Most trees, especially deciduous trees, should be wired in early Spring.
   b. Some trees, especially conifers, can be wired in Fall.

2. Condition.
   a. Tree must be healthy.
   b. Tree should be relatively dry.

B. When to unwire.

1. Depends on weather conditions and the growth pattern of tree.

2. Trees which are wired in Spring should be unwired by mid-Summer.

3. Trees wired in Fall should be unwired in early to mid-Spring.

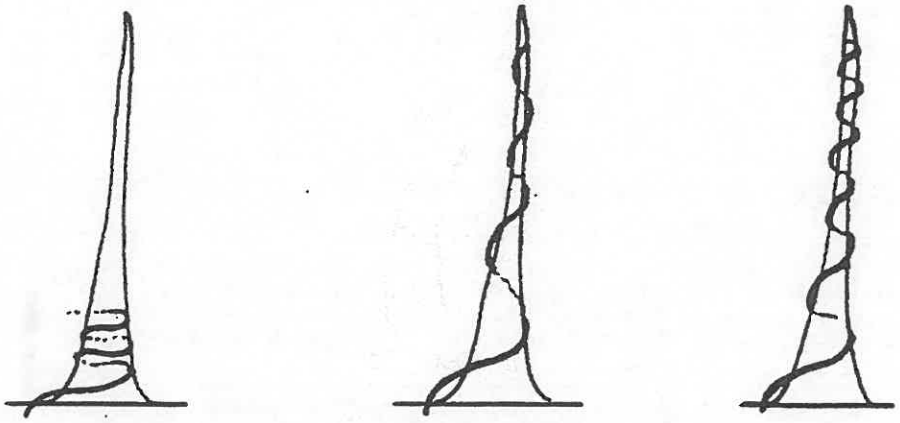
4. Above all, unwire before the bark is scarred by wire.

C. Distance between windings of wire. NOTES

1. Determined by the angle at which wire crosses trunk or branch.

2. Wind wire at a 45o angle to branch.

TOO TIGHT TOO LOOSE GOOD

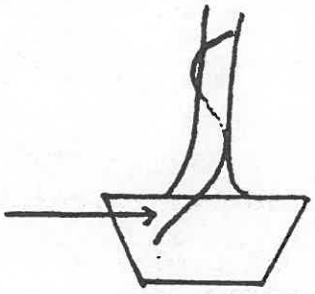


Illus. 5-1

D. Anchoring.

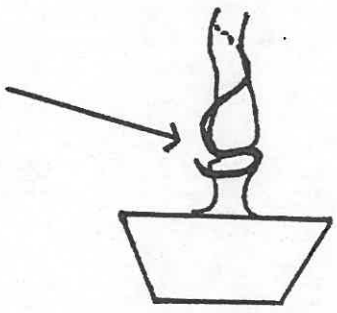
1. Securely anchor wire at its start.

2. Wire on the lower portion of a trunk may be anchored by inserting one or two inches of one end at a 45o angle into soil behind the trunk.



Illus 5-2

3. Do <u>not</u> anchor wire by making a 360o girdling loop around trunk or branch.



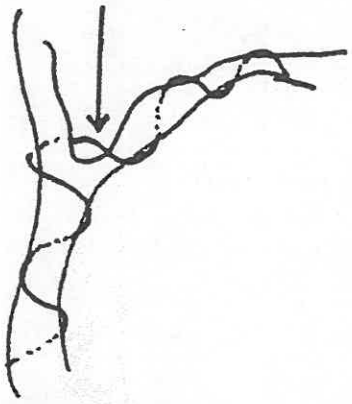
Illus. 5-3

NOTES

4. Wire may be anchored on a trunk before being used to wire a branch.

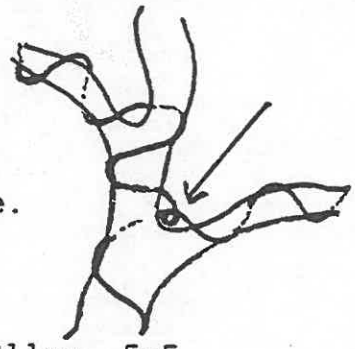
a. Make at least two windings around trunk.

b. The first winding onto a branch begins over the top of the branch.



Illus. 5-4

5. Another anchoring method is to make a small hook on one end of wire and anchoring it by hooking it onto an already existing wire.



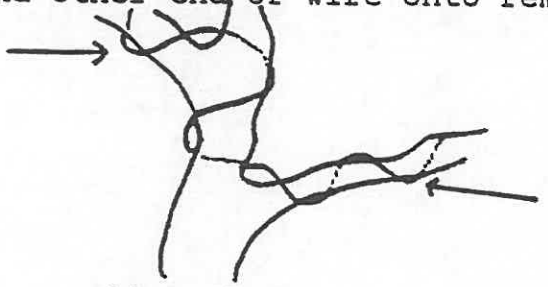
Illus. 5-5

E. One wire may be used for two branches.

1. Wire is anchored around the trunk with at least one complete turn between branches.

2. Wind one end of wire onto one branch.

3. Wind other end of wire onto remaining branch.



Illus. 5-6

NOTES

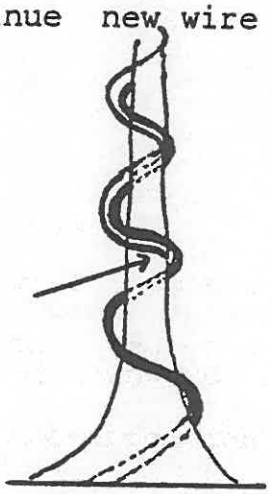
F. Splicing wire.

1. If a wire is too short, "splice" it by using a second wire of equal or smaller diameter than the first.

2. Lay the second piece of wire beside and parallel to the first wire.

3. Wind it parallel to the first wire for at least two complete turns.

4. Continue new wire along unwired tree part.

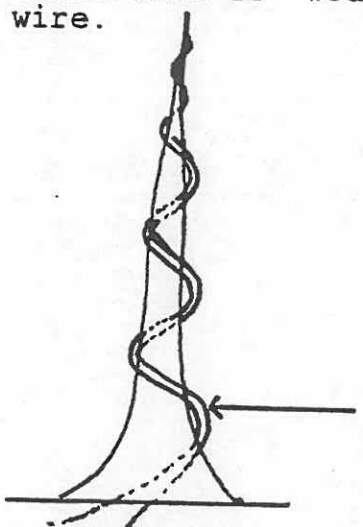


Illus. 5-7

G. Doubling wire for added strength.

1. Two wires, or three if necessary, may be used instead of one heavier piece of wire.

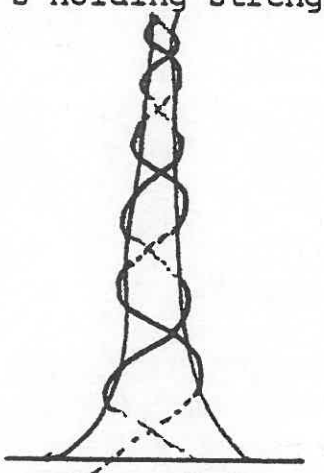
2. The second wire is wound close to and parallel to first wire.



Illus. 5-8

3. Crossing wires girdle the tree and reduce each other's holding strength. NOTES

Do NOT cross wires.



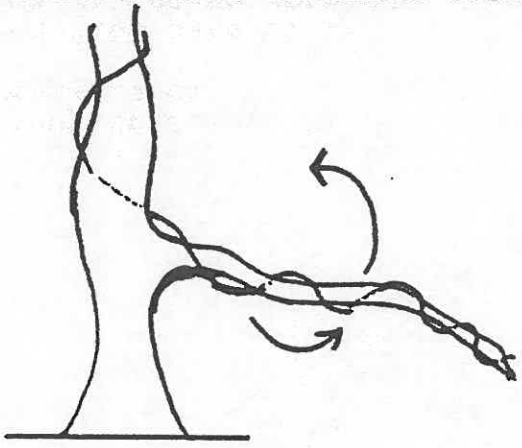
Illus. 5-9

H. Wiring to twist branches.

1. Use when a majority of branch foliage is growing upward and downward instead of lateral.

2. Determine direction in which branch is to be twisted.

3. Apply wire to branch in standard way with one exception. The direction of the winding must be same as the direction of intended twist.



Illus. 5-10

I. Wiring order.

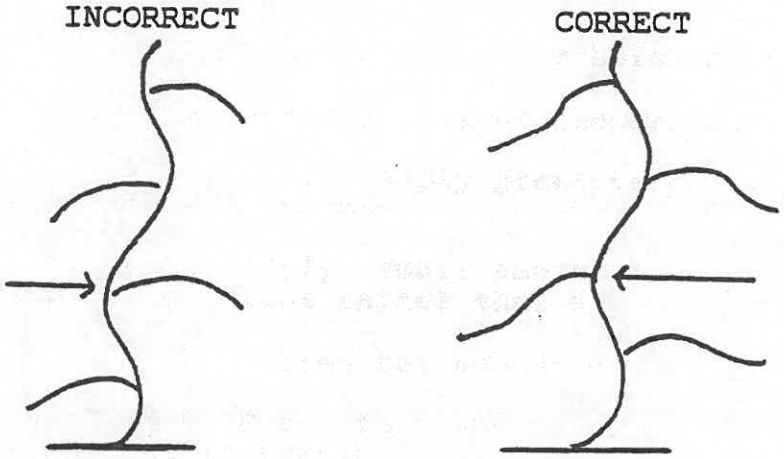
1. Main trunk, if needed.

2. Primary branches.

3. Secondary branches, if needed and if sufficiently mature to be wired. NOTES

J. Wiring a trunk to be curved.

Branches should be placed on the outside of curves.



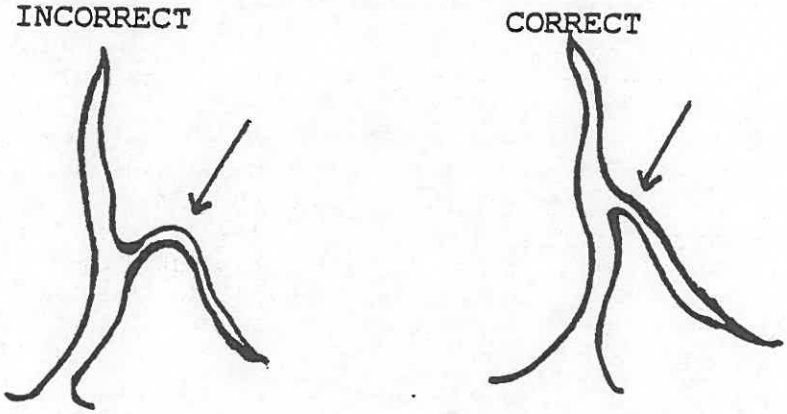
Illus. 5-11

K. Wiring the branches.

1. If trunk is straight, branches should be straight from base to tip.

2. If trunk is curved, branches should be curved or serpentined from base to tip.

3. The downward droop of branches should begin as close to trunk as possible.



Illus. 5-12

4. The tip of the branch flares upward.

V. METHOD OF BENDING

NOTES

A. It is important to realize that wire bends and branches break. The wire is bent and the branch follows.

B. To bend a wired branch:

1. Place both thumbs below branch.

2. Place all eight fingers above branch.

3. Slowly apply pressure pulling top of branch toward thumbs.

4. Apply small amounts of pressure at several locations rather than a lot in one place.

5. Listen for sounds of cracking.

6. Feel for any increased or decreased resistance in branch.

7. If branch cracks
   a. Stop bending,
   b. Apply sealant to wound,
   c. Rebend wire enough to close wound

8. Do bending gradually. Do some now and some a few days from now.

C. Make curves gradual.

VI. SLIDE/TAPE PROGRAM AND PRACTICAL EXERCISE

A. The Bonsai Clubs International slide/tape program number 25, titled, "Wiring Bonsai" may be shown now as a summary of the learning activities covered.

B. A practical exercise may be conducted before leaving this section of the syllabus. It may be appropriate to cut some shrub/tree branches and provide them to the students, along with some sections of wire, and conduct a wiring practical exercise.

VII. SUMMARY

NOTES

A. Copper and aluminum wire may be used when training a tree by wiring.

B. The size of wire, which is appropriate for a particular part of a tree, depends on whether copper or aluminum wire is being used, its diameter, and the diameter of the tree part to be trained.

C. Wire must be anchored correctly, wound at about a 45o angle to the trunk or branch, and should not cross other wires.

D. When bending a trunk or branch, concentrate on bending the wire while being aware of what is happening to the plant part which is following the bend of the wire.

SECTION 6

STYLING THE TREE

I. OBJECTIVES

NOTES

As a result of studying this section of the syllabus and participating in classroom exercises the student will be able to:

1. Identify the lower limit of trunk and locate spreading surface roots.

2. Identify the three lowest branches to be retained.

3. Identify remainder of branches to be kept and ones to be eliminated.

4. Determine front of tree.

5. Create new apex on tree which is in proportion to remainder of tree.

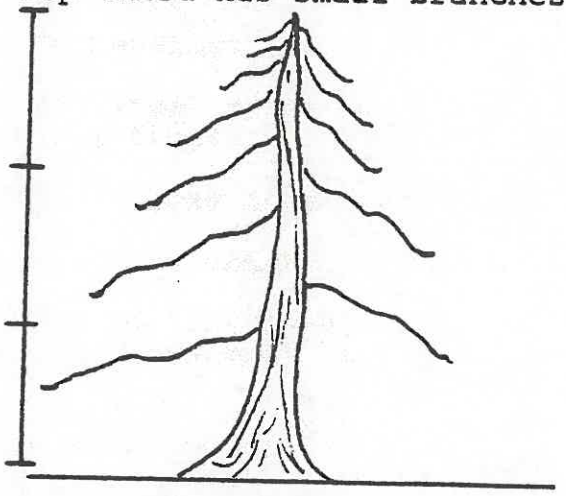
II. THE RULE OF THIRDS

Basic styling using the rule of thirds.

1. Bottom third is branchless with:
   a. Tapered trunk
   b. Spreading surface roots

2. Middle third has branches.

3. Top third has small branches and apex.



Illus. 6-1

NOTES

III. THE LOWER THIRD OF THE TREE

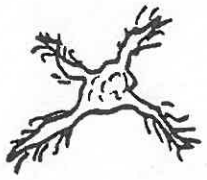
A. Begin styling from ground up.

B. Lower trunk and surface roots.

1. Remove tree from container.

2. Using a chopstick remove surface soil down to relatively thick radiating roots.

3. Study lower trunk for its
   a. Taper.
   b. Natural curvature.
   c. Items of interest.
   d. Any areas which detract.
   e. Location of surface roots. Ideal location of surface roots, as seen from above, would look like this:



FRONT OF TREE

Illus. 6-2

4. Now tentatively identify tree's front.

IV. MIDDLE THIRD OF THE TREE

A. Lowest branch:

1. Is heaviest branch.

2. Radiates either to left or right when viewing tree from front.

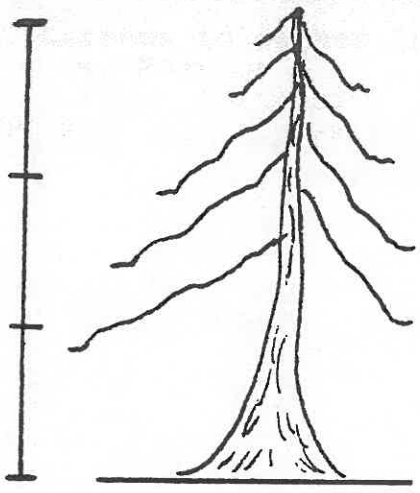
3. Never goes toward rear.

4. Is about one-third way up tree.

5. To identify lower one-third of tree, the probable apex area must be located.

6. With lowest branch and area of apex identified, tree can be divided into thirds.

third its height, bareness may be hidden with severely drooping branches.



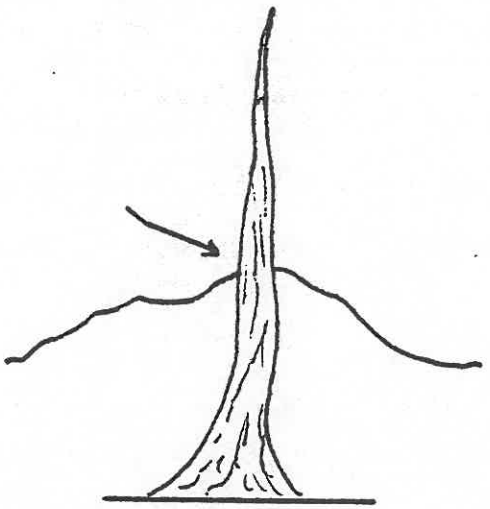
Illus. 6-3

B. Second lowest branch.

1. Is the second heaviest branch.

2. Extends to either the:
   a. Opposite side of tree from lowest branch, or
   b. Rear of tree.

3. Avoid "T" or "Bar" branches:



Illus. 6-4

NOTES

C. Third lowest branch.

1. Is the third heaviest branch.

2. Extends to either the:
   a. Rear or
   b. Opposite side from that of lowest branch, depending on placement of second branch.

3. Avoid having a "T" or "Bar" branch.

D. Mark tentative front of tree.

1. Location of the front is based on identification of first three branches

2. Mark front by placing a marker in soil in the exact position of the front or rear.

E. Subsequent branches

1. The higher the branches the shorter becomes the space between them.

2. Branches should continue to alternate position to the left, right and rear as they progress up tree.

3. Continue to avoid having "T" or "Bar" branches.

4. Avoid branches coming directly toward front on lower two-thirds of trunk.

V. FRONT OF THE TREE

A. Consider several factors when defining the front of the tree:

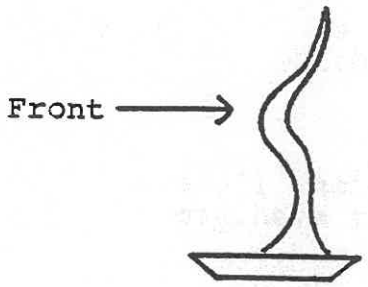
1. Best view of lower trunk
   a. Taper
   b. Curvature
   c. Items of interest or detraction.

2. Best view of surface-clinging roots.

3. Location of first three branches.

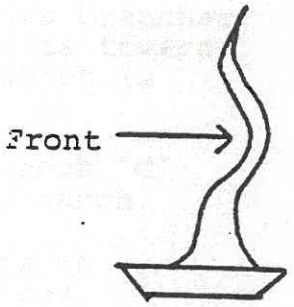
4. If a side has few or no branches it may have to be the front.

5. Evaluation of overall trunk line: NOTES
   a. Avoid "pigeon breast" effect:



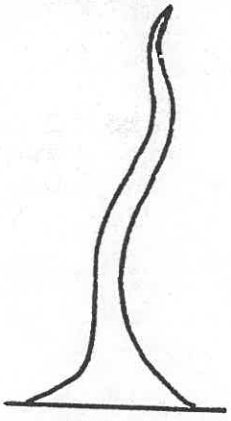
Illus. 6-5

b. Avoid reverse "pigeon breast" effect.



Illus. 6-6

c. Take advantage of natural flow and visual movement of trunk.



Illus 6-7

NOTES

d. Any major cut made when creating apex should be placed to rear of tree.

B. After all of this is considered, identify that portion of the tree which is to be the front.

VI. THE APEX

A. To keep overall height of a bonsai in proportion, the top may have to be removed and new apex created.

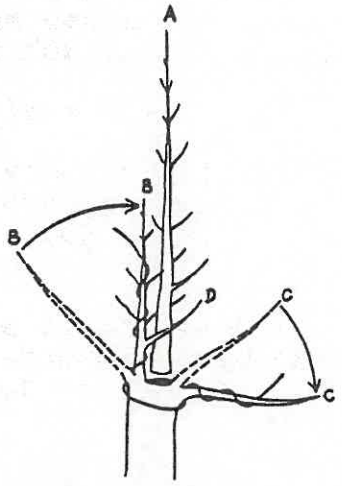
B. A new natural looking apex may be created by wiring a front branch up.

C. Cut off and remove portion of original trunk. (Part "A" in illustration to the right.)

D. Leave two branches. (Part "B" which is towards front and "C" which is towards rear.)

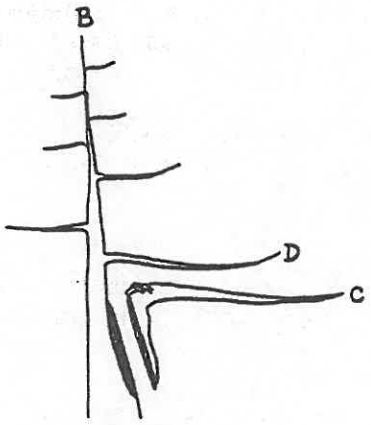
E. Wire branch "C" down as a rear branch.

F. Wire branch "B" up as new apex.



Illus. 6-8

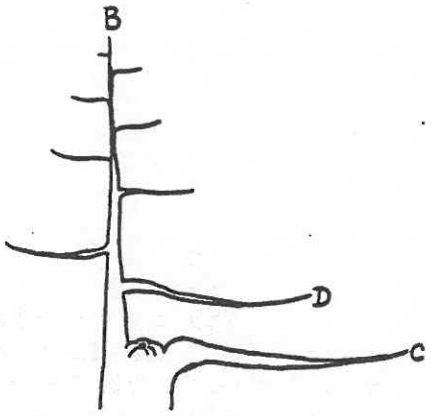
G. After branch "D" on newly formed apex grows large enough, it should replace branch "C" by cutting branch "C" off at an angle.



Illus. 6-9

NOTES

H. If branch "C" is left on too long, the base of branch "B" where the original trunk "A" was cut off, will not taper into a natural form.



Illus. 6-10

VII. VIDEO TAPE

A. The Bonsai Clubs International video tape number 1, titled: "Designing a Bonsai" may be begun now. First segment of program deals with decisions in styling and is appropriate for showing now.

B. Reevaluate plan for class tree.

1. A bonsai is a living art form
   a. The bonsai changes, and
   b. The owner's technical skill and art appreciation changes.

2. After viewing the first segment of the BCI video tape, the student should review previous decisions concerning styling of tree.

VIII. CREATING THE BONSAI

A. Now proceed with completion of the bonsai. Instruction so far has covered pruning, wiring and styling. Relatively firm decisions have been made concerning style, branch placement, surface roots and apex location. It is now time to prune and wire to bring this plan to fruition.

B. Begin wiring with trunk. Then proceed to branches, beginning with lowest and working upward.

C. Video tape.

If the BCI video tape number 1 is being used, it should be continued now showing portion dealing with wiring of a tree.

D. Complete the pruning, wiring and creation of the bonsai-in-training.

IX. SUMMARY

NOTES

A. The first task is to identify the lower extent of the trunk and to find surface-clinging roots. In doing this look for the most pleasing view of the lower third of the tree.

B. Next identify the lowest three branches which begin the middle third of the tree. The lowest branch must project either to the left or to the right. The next branch goes in the opposite direction or to the rear. The third branch from the bottom goes to the rear or in the opposite direction of the other one projecting to a side.

C. Determine the front of the tree based on a variety of factors which include:

1. Root dispersion.
2. Lower trunk appearance.
3. Lower branch placement.
4. Overall trunk line.
5. Overall branch availability.
6. Apex location.

D. Create a new apex to keep the tree's height in proportion to its other dimensions.

SECTION 7

SELECTING A CONTAINER

I. OBJECTIVES

As a result of studying this section of the syllabus and participating in classroom exercises the student will be able to:

1. Select the appropriate color, size and shape container for a particular bonsai.

2. Identify the front of a container.

II. COLOR OF CONTAINERS

A. Brown Containers

1. Glazed and unglazed brown containers are used for any specie.

2. Conifers (cone-bearing trees) and most evergreens are best in brown pots.

3. Arid species do best in unglazed pots.

B. Colored Containers

1. White or brightly colored, glazed or unglazed are for broad leaf, deciduous, fruiting, flowering bonsai or ones whose leaves change color.

2. The pot color compliments the tree's flowers, fruit, bark or leaves if they change color.

3. Dark colored containers are strong colors for bonsai with strong character.

4. Multicolored and/or decorated pots are for spectacular bonsai.

5. Miniature mame bonsai may break most of these rules.

III. SIZE OF CONTAINERS

A. The container must accommodate the roots and compliment the tree.

NOTES

k/ most all Conifers & Juniper will be planted in earthen-tone containers (brown or gray unglaz Glazed for trees that flower, Can break all rules on mame

(Azaleas need deep pots

Dept of Container = dia of trunk

Trays can be used for group plantings

SECTION 7, SELECTING A CONTAINER

B. Container size for formal and informal upright, slanting, windswept and broom style bonsai:

1. Length is slightly more than two-thirds tree height or width, whichever is greater.

2. Depth equals the diameter of base of trunk.

3. Width is slightly narrower than spread of branches as seen from side.

C. Cascade Bonsai.

1. Depth is
   a. Less than or more than length of cascade
   b. And is less than or more than height of tree.

2. Diameter is
   a. Equal to diameter of trunk.
   b. Plus length of anchor root.
   c. Plus length of cascading branch from trunk to container.

D. Bunjin or Literati Bonsai.

1. Containers are usually quite shallow.

2. Diameter is about one-third height of tree.

E. Miniature Bonsai (Mame or Shohin).

1. May violate most rules about size.

2. Usually are over-potted in deep pots.

F. Slanting or Windswept Bonsai.

Longer, narrower or smaller containers accentuate lines of tree.

G. Multiple-Trunk Trees.

Use the tallest tree for calculations.

NOTES

Rugged tr
= rugged





IV. SHAPE OF THE CONTAINER

NOTES

A. Style of tree dictates shape of container.

1. Angled appearance - use an angled pot.

2. Rounded or curving appearance - use pot which is rounded in appearance.

3. Massive or delicate appearance - use an appropriately massive or delicate container.

4. Upright tree - rectangular container.

5. Slanting or windswept tree - use oval container.

6. Broom style - use oval or round pot.

7. Cascade style - use round or an equal-sided container.

8. Bunjin - use round or even-sided pot.

B. Character of tree may dictate a change to these general rules.

V. FRONT OF CONTAINER

A. Oval or rectangular pot, longest side is front.

B. Square or hexagonal container, a flat side is front.

C. Even-sided or round containers, front is with a foot in the center or with feet on both sides of front.

D. Other containers, use most appealing side.

VI. SLIDE/TAPE PROGRAM OR PRACTICAL EXERCISE

The Bonsai Clubs International slide/tape program number 4, titled, "How to Select a Container" may be shown now or a practical exercise using a selection of pots and trees may be conducted to determine the one appropriate for a particular tree.

VII. SUMMARY

NOTES

A. The color of a container is governed by the specie of the tree and by the color of its flowers, fruit, leaves or bark.

B. The size of the container is a proportional ratio based on the size of the bonsai.

C. The shape of a container must compliment the shape of the bonsai.

SOIL

I. OBJECTIVES

NOTES

As a result of studying this section of the syllabus and participating in classroom exercises the student will be able to:

1. Describe the essential characteristics of soil.

2. Explain general procedure for making a soil mix.

3. Select the appropriate soil for a particular specie plant.

II. GENERAL

A. Soil is the medium in which the plant's roots grow. Soil provides:

1. An anchor for the tree.

2. A medium for retention of moisture and nutrients to feed roots.

3. A medium that contains air which is necessary for roots to take up nutrients.

B. The successful soil medium:

1. Is porous enough to include air.

2. Is absorbent enough to hold moisture long enough but not too long.

3. Is a combination of materials based on growing conditions, environment, watering practices and specie of tree.

III. SOIL MIXES

NOTES

A. Following soil mixes have proven successful for the author living in east central Florida.

B. Formula for an azalea/gardenia mix.

1 part sphagnum peat moss
1 part coarse sand
1 part pine bark
1 part compost
1 tsp minor elements @ gallon soil.
1 tsp superphosphate @ gallon soil.

C. Formula for a general purpose mix.

1 part sphagnum peat moss
1 part coarse sand
1 part compost
1/2 part calcinated clay
1 tsp minor elements @ gallon soil.
1 tsp superphosphate @ gallon soil.

D. Formula for conifer soil mix.

1 part sphagnum peat moss
2 parts coarse sand
2 parts compost
1/4 part Milorganite
1 tsp minor elements @ gallon soil.
1 tsp superphosphate @ gallon soil.

E. Following is an explanation about various components and mixing procedures when making a soil mix.

1. Sifting of the various components is essential for a successful soil mix.

a. Large particles are removed to prevent them from occupying valuable space in the container.

b. Fine material has to be removed to avoid compacting soil and excluding air.

2. The sphagnum peat moss (Canadian is preferred) is available from most garden stores. It must be sifted to remove large and fine material, retaining only middle sized material for soil mix.

3. Coarse sand may be the most coarse sand-blasting sand available from construction supply houses or lumber yards. Sift out fine material.

NOTES

4. Pine bark must be relatively fine, no larger size than a dime in diameter. Available from garden stores.

5. Compost is soil made by decomposing plant material. A good quality commercial soil can be used. It must be sifted as was the peat moss.

6. Calcinated clay is similar to "kitty litter". It is used to dry oil spills in garages and is available from chemical and cleaning supply houses. In garden centers it is sold as a soil amendment called "Turface". Sift out fine material.

7. Minor elements are marketed under different names like "Fritted Trace Elements". Available from garden or feed supply stores.

8. Superphosphate is a type of fertilizer available under various brand names from garden or feed supply stores.

9. "Milorganite" is the brand name of a pasteurized sewage sludge.

F. The objective of the bonsai soil is to give the tree a well-watered yet sufficiently aerated growing medium.

IV. PRACTICAL EXERCISE

The student, observing a display of live plant material or a projection of slides showing a variety of species, should be able to:

1. Identify the growing environment most appropriate for each tree.

2. Identify the soil mix most appropriate for each tree.

V. SUMMARY AND CONCLUSION

A. Soil provides the basics for the tree. It is its anchor and its supplier of moisture and nutrients.

B. Soil mixes differ according to specie of tree, watering habits and other environmental conditions.

SECTION 9

POTTING

I. OBJECTIVES

NOTES

As a result of studying this section of the syllabus and participating in classroom exercises the student will be able to:

1. Prepare a container for potting.

2. Prepare roots of tree for potting.

3. Demonstrate proper placement of a tree in container.

4. Secure tree in container and fill with proper amount of soil.

5. Demonstrate correct method of soaking recently repotted plant to prevent shock.

6. Complete soil surface preparation to include planting moss.

7. Describe aftercare necessary for a recently repotted bonsai.

II. PREPARING THE CONTAINER

A. Drain hole covers.

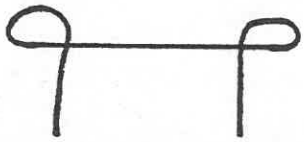
1. Drain holes are covered with mesh to:
   a. Prevent soil from running out.
   b. Deter entrance by insects.

2. With the pot upright, cover the drain holes with squares of screen wire or other mesh about twice the size of the drain holes.

3. Attach the mesh over the drain holes using about a four inch length of small diameter wire formed as follows:
   a. Using about one-third of the wire, form a loop with one end. Bring the end of the wire over the top of itself. Bend the end downward at a 90o angle. This is one leg which will be passed through the mesh covering the drain hole.
   b. Repeat the process on other end.
   c. The length of the wire between the two "legs" should be about equal to the diameter of the drain hole.

DIAMETER OF DRAIN HOLE NOTES

TOP VIEW OF WIRE 

SIDE VIEW OF WIRE 

Illus. 9-1

4. Insert the two ends of wire through the mesh over the drain holes and bend flat on underside of container.

5. Repeat for each drain hole.

B. Tree tie-down wire.

1. Cut a length of wire which is about three times the distance between the two major drain holes.

2. With pot inverted, insert wire through mesh at the inside edge of each drain hole.

3. Turn pot upright and lay ends of wire over edge of container to await further use.

C. Select front of container.

D. Select proper soil for particular tree.

E. Cover bottom of container with thin layer of soil creating slight mound where center of root ball will be placed.

III. ROOT PREPARATION

A. Video tape.

Bonsai Clubs International video tape number 1 titled, "Designing a Bonsai", may be continued at this time. The final portion of the video tape covers pot selection, root preparation, and potting.

C. Check root ball for insects.

D. With a chop stick or root rake remove about one-half of the soil from the underside of the root ball.

E. Remove most of soil from back of root ball.

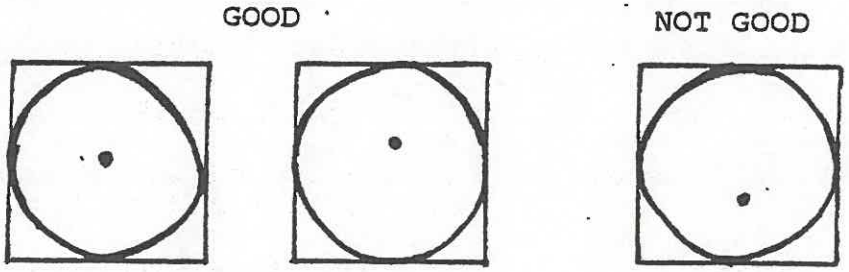
F. Determine if tree will be offset to left or right in container.

G. Remove most of soil on side of root ball toward which tree will be offset.

H. Remove any tap, thick or encircling roots.

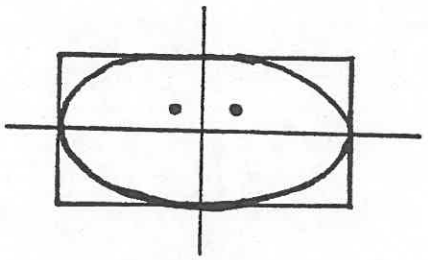
IV. LOCATING THE TREE IN THE CONTAINER

A. If container is round or square, tree is placed in center or very slightly toward rear.



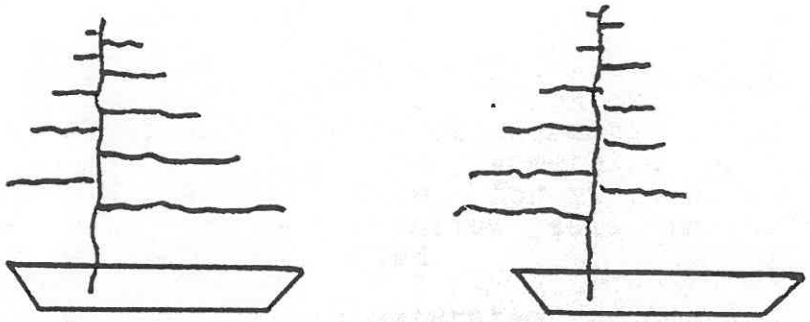
Illus. 9-2

B. If container is rectangular or oval, tree is placed toward rear and left or right of center.



Illus. 9-3

C. Longer branches and long side of triangle extend over the greater space created by offsetting. NOTES



CORRECT INCORRECT

FRONT VIEW

Illus. 9-4

V. POTTING THE TREE

A. Positioning tree in container.

1. Place center of root ball on mound.

2. Insure enough soil has been removed to permit tree to fit into container.

3. Remove any roots which are interfering with tree placement.

4. Lean tree slightly toward the viewer.

5. Insure trunk angle to left or right is correct.

6. Junction of trunk and root ball must be above the lip of the container.

7. Secure tree into container by pulling tie-wire across top of root ball. Thread wire under any large surface roots. Twist wire to tighten.

B. Adding soil

1. Fill container with dry soil mixture.

2. With a chop stick, poke the dry soil into any air pockets.

NOTES

3. Create one-quarter inch depression or "water cup" around edge of soil where it meets the side of container.

4. Brush soil surface, removing any large particles.

5. Set potted tree into a container of water containing "Superthrive", a nontoxic solution of vitamins, hormones and trace elements. It helps plant to uptake carbohydrates, something which is difficult, if not impossible, for it to do on its own when under stress. Allow soil in bonsai container to become saturated.

6. When soil is saturated, remove and drain.

7. Plug moss into soil surface.

VI. AFTERCARE

A. For two weeks after severe root pruning, limit tree to two hours of sunshine a day, no wind, no fertilizer, and do not let it dry out.

B. After two weeks, if there are no signs of stress, begin giving it more sunlight.

C. Water with a "Superthrive" solution at least once a week for a month.

VII. SUMMARY

A. A bonsai container is prepared for potting by covering the drain holes with a mesh and by installing a tie-wire to hold the tree in the container.

B. Prepare the roots of the tree to fit into container. Remove much soil and the larger roots.

C. Place tree in container, offset to rear and to left or right and leaning slightly toward viewer.

D. Soil to be used must be dry and correct components for the specie tree being potted.

E. Tree is tied into container, the container is filled with new soil, a "water cup" is created around edge of soil and its surface is cleaned of large particles.

F. Tree is placed into a solution of water and "Superthrive" until new soil and root ball are saturated. NOTES

G. Moss may be planted on soil surface.

H. Aftercare is important to insure recovery and continued health of tree.

SECTION 10

PLANT CARE AND MAINTENANCE

I. OBJECTIVES

As a result of studying this section of the syllabus and participating in the classroom exercises the student will be able to:

1. Provide the requisite intensive care for a recently potted or repotted tree.

2. Identify what would be the appropriate growing environment for various species of trees.

3. Apply the correct amount of water to trees depending upon their specie, environment and weather conditions.

4. Describe what would be the proper method of controlling insects and diseases which might affect bonsai.

5. Apply the proper type and amount of fertilizer to a bonsai at the correct intervals.

6. Construct a bench for growing bonsai outdoors.

7. Discuss several security precautions appropriate for bonsai which are kept outdoors.

8. Explain the advantage of maintaining a plant record.

9. Repot a bonsai at the correct time and in a proper manner.

II. INTENSIVE CARE

A. Intensive care must be provided to a tree which has recently been repotted or which has had major pruning or wiring.

B. For two weeks, or until the plant begins to show new growth and no signs of stress, provide about two hours of sunshine a day, no wind, no fertilizer, and water daily. Every five to seven days drench the root ball with Superthrive enhanced water.

NOTES

Repot ea
Spring (Ap
After repo
Soak tre
Water -
Super th
& Organ
Clean
Watting
$9.50
Cane
Put tre
in shad
out of
Wait
week
Watting
Leave i
Intensi
for 2-
Leave o

C. Signs of stress include:

NOTES

1. No new growth.

2. If there is new growth, it soon wilts.

3. Leaves begin to lose their color.

4. The plant seems to be using less than normal amounts of water.

D. After a two week period, or when it appears that there are no stress related problems, begin giving plant more sunlight. Within a week or two it should be living in its normal environment.

III. GROWING ENVIRONMENT

A. If the tree is a specie which requires a high level of sunlight, it is an outdoor tree and, even as a bonsai, must be grown outside.

1. Protect tree from high winds.

2. Place tree where heavy rains will not wash soil from container.

3. Give tree some "elbow room". It needs to have light and air circulation.

4. Keep growing area clear of debris.

5. Remove weeds from container.

6. Turn tree occasionally so that all of the sides get an equal amount of sun.

7. Avoid setting tree on ground where it is more subject to damage and to infestation by insects.

8. When brought indoors for display, keep in for only a day or so.

(Watch for extreme in temps. Keep away A/C heating.)

9. When indoors, avoid placing tree in direct line with heating and cooling vents or near heating devices.

10. If tree is to be brought indoors for a display, allow it to gradually adjust to the warmer environment (or colder environment when returning it to the outside).

Primwater #1 will water #2

a. Relocate when the outdoors is at its warmest.

"Fog it" nozzle

NOTES

b. If there is a great difference between the indoor and outdoor temperatures, let tree adjust at an intermediate location.

B. If the tree is a specie which will survive in an indoor environment:

1. Place near an exterior window giving a high level of indirect light.

2. As an alternative, use grow lights of adequate intensity placed close to tree.

3. Closely monitor amount of water used.

4. Consider growing tree on a humidity tray which will provide a humid micro-environment.

5. Avoid placing tree in direct line with heating and cooling vents or near heating devices.

IV. WATERING

A. Water.

1. Rain water is preferred.

2. Well water is usually second-best.

3. If chemically treated tap water is used, it is best to allow it to stand for 24 hours in an open, wide-mouthed container to evaporate volatile chemicals.

B. Equipment.

1. To reduce soil erosion, use a long-spout watering can with a fine spray head.

2. Or use a hose with a control valve and a fine spray "Fogg-it" nozzle attached.

C. Watering technique

1. Water daily or when the soil surface appears to be dry.

2. Gauge the relative dryness of soil by its color, coolness to touch and/or by appearance of foliage.

3. Wet soil evenly.

4. Saturate soil until water flows out of drain holes of container.

5. If tree is very dry, spray leaves too, providing foliar watering.

6. To avoid scorching, do not expose wet leaves to bright sunlight in hot weather.

7. Do not water in evening when there is a danger of freezing.

8. Young trees usually require more water than do older ones.

9. Trees living outdoors usually require more water than do ones indoors.

10. Windy conditions demand more frequent watering.

11. Large-leafed trees and fruit trees require more water than trees with needle type leaves.

12. Trees in unglazed containers require more water than those planted in glazed containers.

NOTES

V. INSECT AND FUNGUS CONTROL

A. Insects.

1. Those living on and off of the surface may be eradicated with a contact spray insecticide.

2. Sucking-type insects are controlled with a systemic spray and/or soil drench.

3. Indications of presence of sucking-type insects include:
   a. A lightening of the color of the leaves indicating a reduction in chlorophyll.
   b. A black sooty mold on the leaves.

4. Snails and slugs must be picked off or may be controlled with a snail and slug bait.

5. Grasshoppers must be picked off.

6. Caterpillars and cut worms may be controlled with a natural material found in a product such as Dipel.

malathion –
Kelthane – (Spider mites)
(organic cleaner maker insecticide add better.

7. Use insecticide at full strength as listed on container.

NOTES

B. Fungus.

1. Fungus is not an insect but rather is a growth on the plant.

fungus:
Bald cypress
crepe myrtle
(Spider mites)
like junipers.

2. Fungus often appears as black spots on leaves.

3. The more humid the environment, the more likelihood there is of fungus. Avoid misting.

Spray 3 or 4 times in a row - Don't like dry foliage.

4. Fungus is prevented and controlled by the use of fungicides.

C. Safety.

1. Read labels on all insecticide and fungicide containers and fully comply with their instructions.

2. Never spray in a closed environment.

3. Avoid getting chemicals on skin or clothing.

VI. FERTILIZING

A. Fertilizer components.

1. Most the fertilizers consist of three separate organic elements: nitrogen, phosphorus and potassium.

Peters.
20/20/20 good all purpose fer
leaches out of soil quickly.

2. Presence of these three elements is indicated on the fertilizer container by three sets of numbers, such as 20-20-20. They tell the percentage of nitrogen, phosphorus and potassium in a particular fertilizer.

3. A well-balanced fertilizer is 20-20-20 meaning that 20% of contents is nitrogen, 20% is phosphorus and 20% is potassium.

B. Using fertilizer.

1. Nitrogen promotes strong growth of shoots and leaves and aids in the green coloring.

2. Phosphorus encourages flowering and production of fruits and seeds.

3. Potassium aids in stiffening of stems, root growth and helps to prevent disease.

C. Application.

1. As a general rule:
   a. Use the Stern's Miracid 30-10-10 fertilizer on conifer and other acid-loving plants.
   b. Use a Peters Special, General Purpose 20-20-20 fertilizer for all other plants.

2. Both of these fertilizers are in a dry form and must be mixed with water and then applied to soil.

3. To prevent burning hair roots, soil should be moist prior to application of fertilizer.

4. Strength and frequency of fertilizing bonsai should usually be:
   a. One-half of recommended strength every two weeks during growing season.
   b. One-quarter recommended strength every month during dormant season.
   c. Significant amounts of rainfall will leach nutrients from soil and more frequent fertilizing may be necessary.

VII. DISPLAYING BONSAI

A. Outdoors.

1. Following is a suggested plan for the construction of an outdoor bonsai display bench.

2. The bench is made of slats to maximize air circulation and to enhance drainage.

3. Materials for a display bench include:

   a. 1"x2" pressure treated firring strips
   b. 1 1/2" galvanized nails
   c. 1/2" threaded rods
   d. Nuts and washers (2 @ rod)

4. Materials for wall supports include:
   a. 2"x2" boards
   b. 3/8"x4" lag screws (2 @ unit)
   c. 3/8" washer (1 @ lag screw)
   d. #8x2 1/2" wood screws (6 @ unit)

NOTES

~~Osm~~ OSmocote time release

Repot in Mar. Wait til July to fert.

Pines: Root fungi (microriza) white webby substance Tree needs this fungus. Make sure pin has this in order to digest fert!!!

Repot: before new growth -

NOTES

5. Tools needed include:
   a. Hand or power saw
   b. Hack saw
   c. Electric drill and bits
   d. Hammer
   e. Wrenches

6. Optional tools include:
   a. Radial arm saw
   b. Drill press

7. Construction Sequence

a. Determine length and width of the shelf desired so the amount of wood needed will be known.

b. Overall width is composed of 1 1/2" increments. (3/4" beam plus 3/4" spacer.) Therefore:

2 beams + 1 spacer = 2 1/4"

3 beams + 2 spacers = 3 3/4", etc.

c. The threaded rod and spacer assemblies should be from 18" to 2' apart at ends. For example, if a 4' bench is being built, place 2 rod and spacer assemblies at 15" from ends and 18" from each other.

d. Lay out the measurements on paper before doing any cutting or drilling.

e. Measure wood and cut.

f. Drill wooden beams.

g. Drill the spacers before cutting, then cut spacers.

h. Cap threaded rods with washers and nuts and insert a rod assembly through beam, insert spacer, etc. When all beams and spacers are on rods, put other washers and nuts on open ends of rods and tighten fully using two wrenches.

i. Cut excess rod off with hack saw.

j. Nail the end caps on.

8. Diagrams of a bench and supports are attached as an APPENDIX to this Syllabus.

B. Security.

1. Security must be a consideration as bonsai are highly vulnerable to theft.

2. Consider growing in a back yard with a high fence or hedge to restrict viewing from outside and to deter entry.

NOTES

3. Consider an upper-level area on which to grow bonsai.

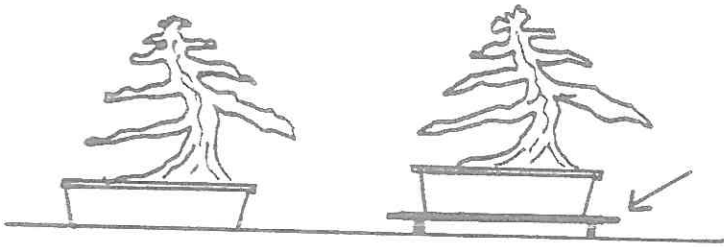
4. An intrusion-detection device may be appropriate.

5. Insure that bonsai are covered on home owner's insurance policy.

C. Indoor display.

1. Bonsai are best displayed on stands to set them apart from the supporting table or shelf.

2. Like the container, the stand should compliment and not detract from the bonsai.



Illus. 10-1

VIII. BONSAI RECORD

A. A written record of history of tree should be kept. A sample record is attached as an APPENDIX to this Syllabus.

B. Photographic records are useful in showing development of tree and for identification if tree is stolen and recovered.

IX. REPOTTING

A. It is essential that a bonsai be repotted periodically to encourage new hair root growth and to replenish soil.

B. Conifers are usually repotted every second or every third year.

C. Most other species of trees are repotted annually.

D. Most repotting is done in early spring prior to appearance of new growth.

NOTES

E. Repotting procedure:

1. Evaluate the tree's placement in the container. Determine if it needs to be relocated within container. If so, decide where root ball needs to be trimmed to accomplish this relocation.

2. Determine if tree has grown to such an extent that it needs to be placed into a larger container. Potting-up is usually not necessary.

3. Determine if the shape of container is appropriate. If it is not, obtain a replacement container prior to beginning repotting.

4. Remove tree from container.

5. Wash and clean container. It may be necessary to remove mineral deposits from container. If so, soak entire container in a ceramic container filled with an undiluted solution of a product called "Lime Away". After bubbling stops, remove container and gently scrub any remaining deposits. If necessary, reimmerse the container in cleansing solution. When satisfied, rinse container well and recover cleansing solution for another day.

6. Install new drain hole covers and retaining wires.

7. Prune about one-third of roots from bottom and sides of root ball.

8. The remainder of repotting procedure is similar to potting described earlier.

9. Insure intensive care is provided as described previously.

X. SUMMARY

A. Intensive care is essential for recently potted or repotted bonsai.

B. The growing environment includes providing adequate sunlight, cleanliness of area, adequate air circulation and freedom from weeds and trash.

C. Watering is probably the most essential skill to learn in tending bonsai. Without water there is no way trees can survive.

NOTES

D. Insect and disease control are essential for continued prosperity of the tree.

E. Proper fertilizing provides the tree with essential organic elements necessary for healthy growth and appearance.

F. Manner in which a tree is displayed affects its health and esthetic appearance.

G. An historical record of the tree documents its origin and major changes during development.

H. Periodically the tree requires repotting to maintain its health.

SECTION 11

SELECTING NURSERY STOCK

I. OBJECTIVES

NOTES

As a result of studying this section of the syllabus and participating in a practical exercise the student will be able to:

1. Identify healthy plants in a nursery.

2. Identify species of plant material which are appropriate material for bonsai.

3. Select specimens with the greatest bonsai potential and explain the reasons for the choice.

II. SELECTING HEALTHY PLANTS

A. Avoid plants which lack vigor or which have excessive new succulent growth.

B. Avoid plants whose trunks and branches:

1. Are weak or poorly formed.

2. Have excessive scaring, scars are not healing, or poor pruning cuts showing excessive protrusion.

3. Have poor graft unions or ones not healing properly or which are roughly cut.

4. Branches are poorly distributed.

5. Have severe creasing, cracks, cambium peeling, cavities, holes or dead wood.

6. Have cold damage.

C. Avoid plants whose leaves:

1. Are an improper shape, size, texture or color.

2. Have an excessive amount of chlorosis (lack of chlorophyll) due to mineral deficiency.

3. Show excessive pest or mechanical damage.

NOTES

D. Avoid plants whose root systems:

1. Are not well established in container.

2. Are excessively pot bound.

3. In ball and burlap stock are too loose or ball is too small or too shallow.

4. Have excessive weed growth.

III. SELECT APPROPRIATE SPECIE FOR BONSAI

A. General.

1. Growth characteristics.

2. Some material is inappropriate because of environment in which it has to be grown.

3. Others may be inappropriate because of their size.

B. Size. Consideration must be given to:

1. Size of plant at time of selection.

2. Size of leaves.

3. Size of flowers and fruit.

C. Shape. Consideration must be given to:

1. Natural shape of the specie.

2. Shape of leaves.

3. Whether shape of specie lends itself to a single or multiple planting.

D. Attitude. Some specie must grow in an upright attitude while others must be prostrate.

E. Mass. Mass is impression of visual weight. Consider:

1. Trunk diameter.

2. Internodal distance.

3. Foliage density.

4. Surface roots.

NOTES

F. Color. Consider:

1. If plant has a natural, healthy color.

2. Amount of variegation, if any.

3. Color of flowers and fruit.

4. Seasonal color.

G. Texture. Consider:

1. The impression it gives of coarseness or fineness.

2. The relationship of size, number, and spacing of leaves, twigs, flowers and fruit.

H. Rate of growth of foliage and roots.

I. Water requirements.

J. Temperature requirements and limitations.

K. Light requirements.

L. Leaf persistency.

1. Evergreen

2. Deciduous

IV. BONSAI POTENTIAL

A. Consider native species over imported ones.

B. Consider a dwarf variety over the standard size of the same specie.

C. Consider:

1. Trunk taper.

2. Branch distribution.

3. Surface roots.

4. How much training is necessary before it will be a presentable bonsai.

V. PRACTICAL EXERCISE

NOTES

A. At this time it would be appropriate for the students to be taken on a tour of a local nursery where the general health and bonsai potential of various items of plant material will be demonstrated.

B. If a nursery tour is inappropriate, samples of material may be brought into classroom.

VI. SUMMARY

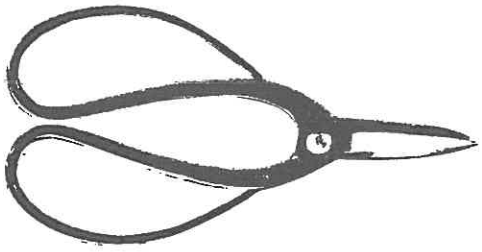
A. A healthy plant has far more potential as a bonsai than does an unhealthy one.

B. Just so much can be done to change a plant's growth pattern. Its genetically determined growth characteristics must be considered when selecting potential bonsai material.

C. Evaluate the plant's bonsai potential by visualizing it as a bonsai, remembering all of the rules and guides discussed previously.

APPENDIX A TO BONSAI SYLLABUS

BONSAI TOOLS



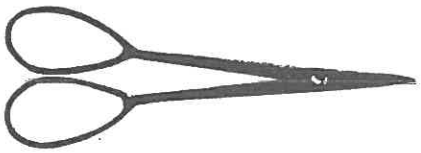
TRIMMING SHEARS



WIRE PLIERS (Lg)



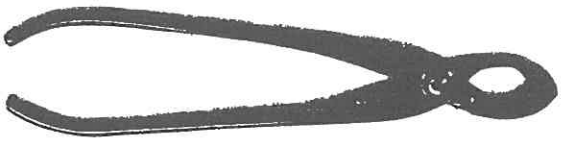
WIRE PLIERS (Sm)



BUD SHEARS



TWEEZERS



CONCAVE BRANCH CUTTER (Med)



ROOT RAKE



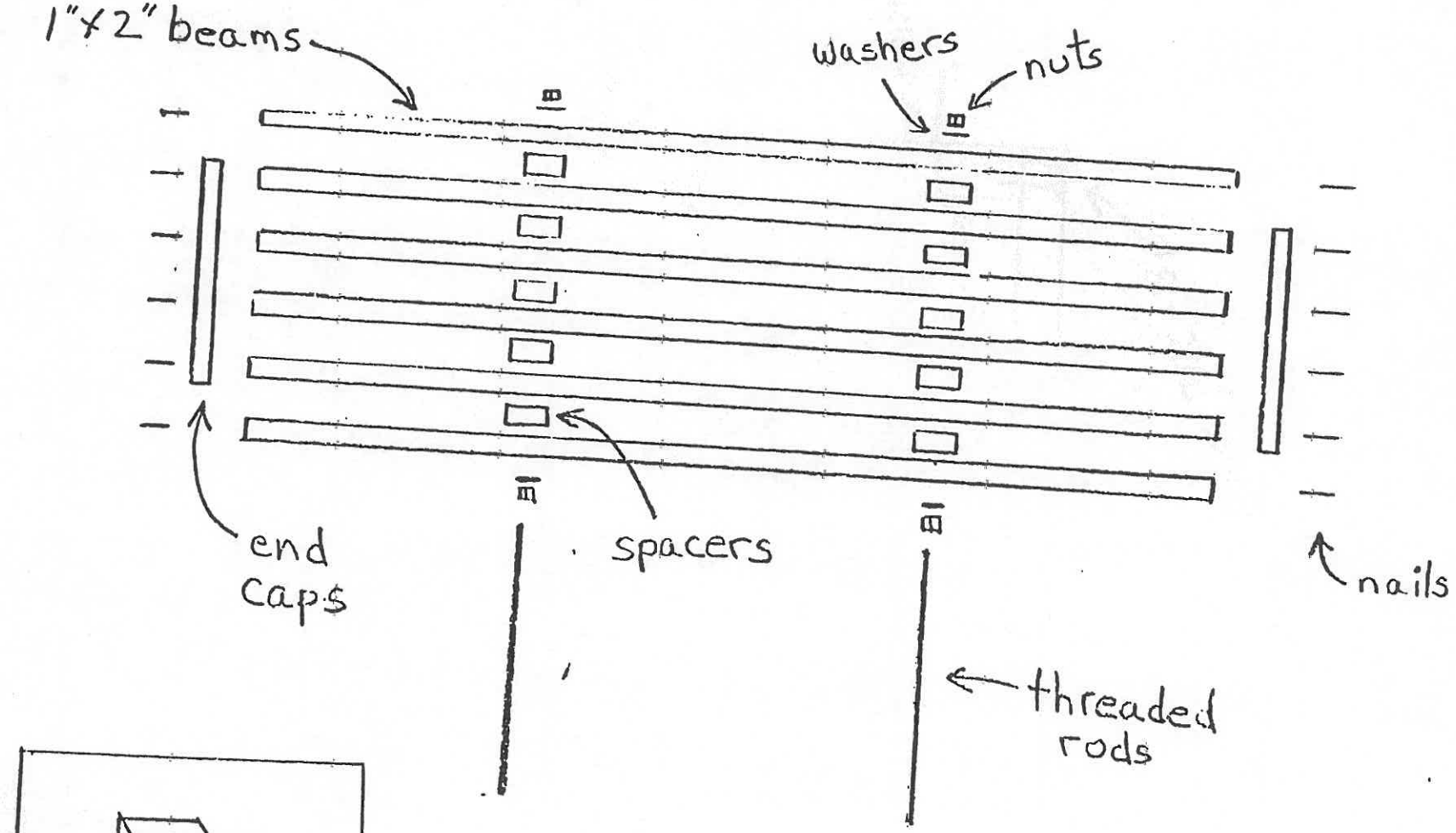
CONCAVE BRANCH CUTTER (Sm)

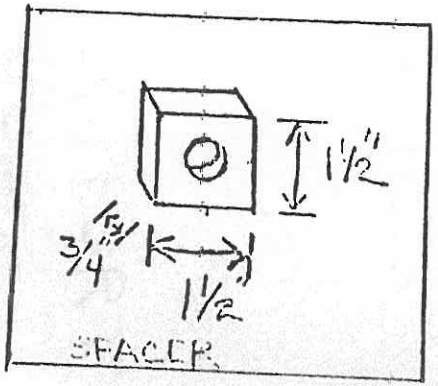


HEMP - PALM BROOM

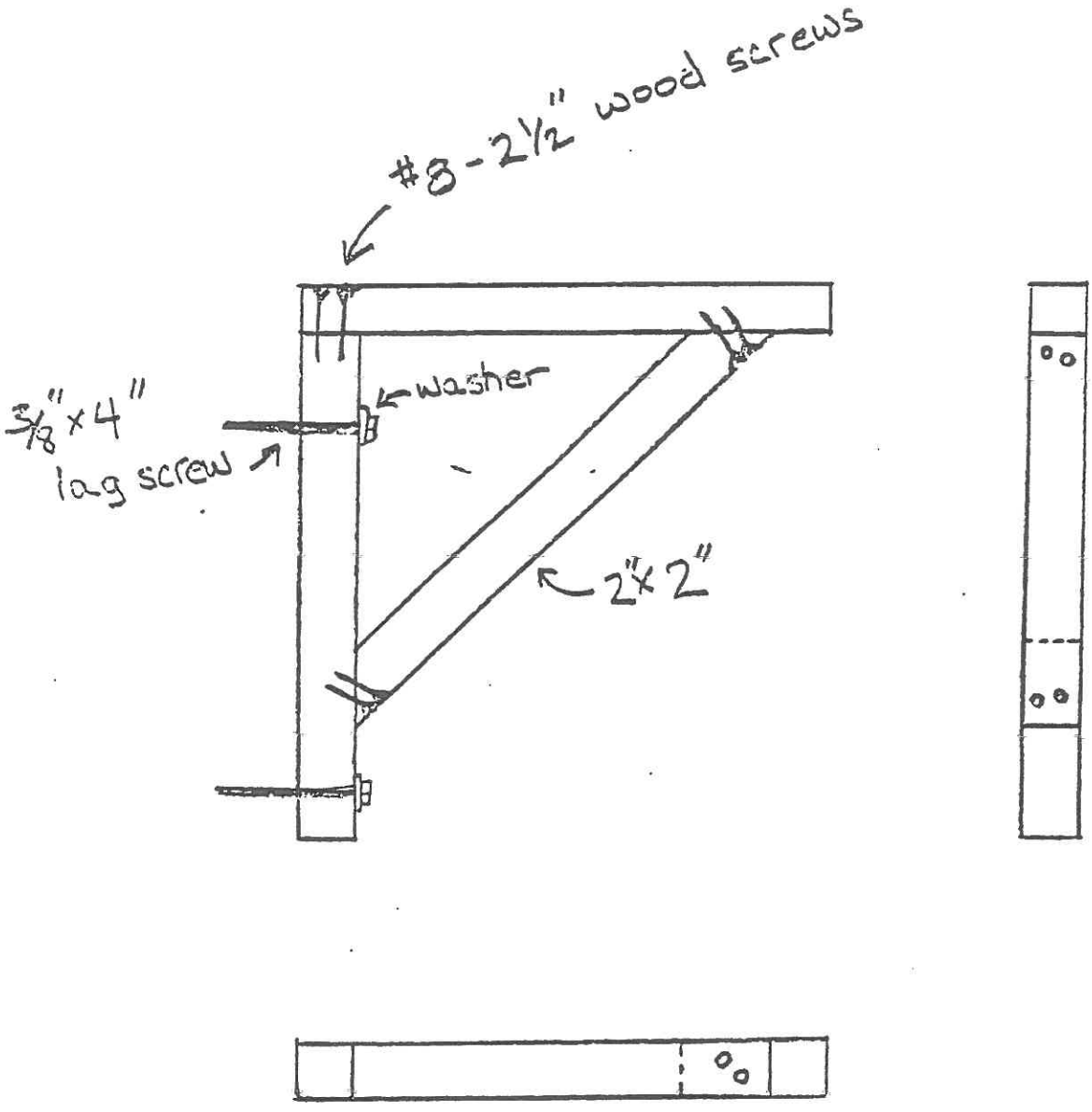


WIRE CUTTER





BONSAI BENCH CONSTRUCTION
EXPLODED VIEW



BONSAI BENCH SUPPORT
wall mount version

TK '85

BONSAI RECORD

BOTANICAL NAME_____

COMMON NAME_____

DATE OBTAINED_____WHERE OBTAINED_____

IF PURCHASED, PRICE PAID_____

ORIGINAL HEIGHT_____ORIGINAL STYLE_____

ROOT SYSTEM: BARE____BALL____CONTAINER____SIZE CONTAINER_____

SEEDLING____CUTTING____NUMBER OF PLANTS_____

AGE WHEN OBTAINED: ACTUAL_____ESTIMATED_____

INSTRUCTIONS FOR CARE_____

HISTORY_____