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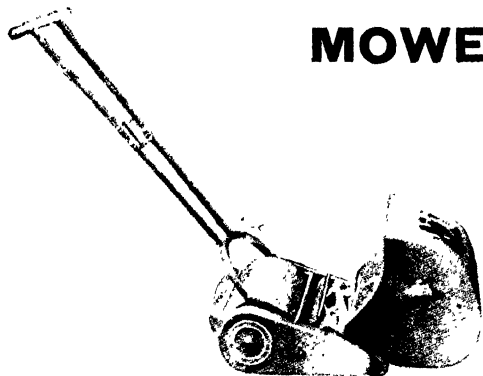
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CONTENTS.

- Page. PREFACE. In which the Author pleads justification for writing the Book.
- 1 CHAPTER ONE discourses on the **Garden in General**, the lay out, how to set about it ; introduces you to the garden implements necessary and gives a few general hints, one of the first being to obtain a copy of the "Gardening Calendar" published by the Agri-Horticultural Society.
- 11 CHAPTER TWO refers to **Soils & Manures** in common use, tells how, when and what to apply, quantity to use, the preparation of liquid manure ; how to prepare plants for manure and adds a few simple methods of discovering what chemical is lacking in the soil by noticing the appearance of the plant.
- 23 CHAPTER THREE takes you into the realm of **Propagation** and shows the chief methods employed for increasing plants from seed sowing to grafting.
- 31 CHAPTER FOUR deals with **Pruning**. The reasons for pruning are given, how and when to do so and what plants to cut down ; also the different methods to be employed.

Page.

- 39 CHAPTER FIVE introduces us to **Insect Pests** and how to combat them, touches on the seen and unseen powers that destroy plant growth. A few simple recipes are added.
- 47 CHAPTER SIX is concerned with **Weeds** on land or in water, when to destroy them and what to apply.
- 51 CHAPTER SEVEN on **Sports & Hybrids** desires to whet your appetite for this branch of horticulture and refers you to more helpful literature, "How to Hybridise", published by the Agri-Horticultural Society.
- 58 CHAPTER EIGHT tells how to work in the **Annual Flower Garden**, details attention given to seedlings from birth to death; times and seasons of planting, position, selection for bedding, cut flowers, etc. are all considered.
- 78 CHAPTER NINE. **Vegetables**, wanders into the "Cabbage Patch" and shows how to obtain the best results from acclimatised or imported seed at the various seasons of the year. Mushroom, Potatoe and Lucerne cultivation are not forgotten.
- 97 CHAPTER TEN offers advice to the amateur in connection with **Flower Shows** and tells what to Exhibit and how to do so.
- 103 CHAPTER ELEVEN refers to **Hedges** and all about them, what varieties to grow, when to plant and how to prune them.
- 109 CHAPTER TWELVE considers **Pot Gardening** as a whole; this important branch of gardening is much neglected and a comprehensive note deals with soil and attention in the way of watering and manuring and gives selections of what to grow in hanging baskets, etc.
- 115 CHAPTER THIRTEEN offers a short note about **Grass Lawns** but refers the reader to that complete *vade mecum*, "Tennis Courts in India", published by the Agri-Horticultural Society.
- 121 CHAPTER FOURTEEN is about **Shrubs** and strikes a note on a subject about which the amateur badly needs guidance. It tells of the best varieties to grow and in what situations, how to plant, manure and prune them and provides selections of flowering, foliage and berried types.

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- 139 CHAPTER FIFTEEN is equally important being about **Climbers**. The light and heavy sections are separated and advice given as to what care and attention given to these useful plants will produce the best results.
- 151 CHAPTER SIXTEEN. **Trees**, deals with another section of gardening about which most amateurs know nothing and invariably plant the wrong type. Here selections are given and the amateur told how to provide after care and protect with nurse plants, etc.
- 163 CHAPTER SEVENTEEN is about the Queen of Flowers, **Roses** ; you discover how to make a rosery, when and what to plant, how to manure and prune and other hints so important to the cultivation of this plant. Selections of the best Climbers, Dwarf Polyantha, Bedding, Exhibition and Utility types are suggested.
- 171 CHAPTER EIGHTEEN treats on the **Chrysanthemum**, that bugbear of the amateur gardener. The whole subject is carefully considered and all the necessary cultural details are given. Manuring, disbudding, etc., are not forgotten.
- 178 CHAPTER NINETEEN. **Canna**, is honoured by a Chapter on its own ; you read how to obtain the finest results from these delightful plants and are told the best types to grow for bedding and cut flowers.
- 183 CHAPTER TWENTY undertakes to teach you the treatment of **Bulbs**, rhizomes, tubers and all the various botanical families miscalled "lilies." Soil, cultivation, storage, etc., are very fully considered.
- 195 CHAPTER TWENTY ONE discourses about **Palms**, and allied plants, mentions the best varieties for pot culture, avenue or garden planting and tells you the soil and treatment necessary.
- 199 CHAPTER TWENTY TWO is about **Ferns** and one learns why so few amateurs obtain good results with these plants. Compost, planting directions and after care, together with types for pot, basket and fern house cultivation are detailed.
- 208 CHAPTER TWENTY THREE introduces you to the **Fern House** and deals with this important section in as few words as possible. The lay out and design, situation, soil, watering, etc., together with lists of foliage and flowering plants that can be grown under cover are given.

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209 CHAPTER TWENTY FOUR. **Succulents** and allied plants (perennial herbs, etc.) call for a short note too and this Chapter considers soil and situation for Cacti and other plants whether grown in a Rock garden in full sunshine or shade. The amateur will find reference to a number of old favorites described here, the Violet etc.

219 CHAPTER TWENTY FIVE considers **Grasses and Reeds** to which the amateur's attention is specially directed. Varieties, soil and situation are given to show how simple these plants are to cultivate.

221 CHAPTER TWENTY SIX is about **Orchids** and will be of great assistance to the amateur for it tells of the kinds that flower best on the plains and how to look after them.

224 CHAPTER TWENTY SEVEN is quite a short one about the **Water Garden**, a section which is seldom provided for by the amateur.

229 CHAPTER TWENTY EIGHT is our last Chapter and deals with the **Fruit Garden**. In this the amateur is advised what to attempt on the Plains and the Hills, the best types are detailed and it tells you how to get the best results. You receive information about the pests and diseases and learn the ways of ripening and storing fruit.

CONCLUSION. The author invites your co-operation on behalf of the Gardening fraternity and requests—and expects—correspondence.

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PREFACE.

Why written. Questions relating to every day troubles and difficulties experienced by the amateur suggested this book which does not pretend to be a learned treatise on gardening, a chatty discourse on the language of flowers or even a commentary on plants.

It has been written in simple language for the use of the amateur on the plains of India by a *professional-amateur* as it were. Practical information on the various sections of gardening have been dealt with and it is hoped that the book will fill a gap and provide details which other gardening books leave out.

The writer has had twenty-seven of years practical experience in the Alipur Gardens one of which was spent under my father before his death. As an apprentice, he did the actual work with his own hands and these pages are not burked from other writers but, for the most part, written from personal experience. Notes jotted down from time to time and answers to correspondents who have sought advice have formed the base on which the book, now issued, has been built.

The *ordinary* amateur who has an *ordinary* mali and just the *ordinary* size of garden, should find this guide of real help.

Explaining brevity. The various sections of plants have been touched on briefly and only the very hardiest types recommended but the selection should satisfy any ordinary amateur. The idea running through the book is that the great majority of amateurs have little time to study a subject and are served by a *soi disant* mali who is careless and knows very little. To the advanced horticulturist I would suggest communicating with the Agri-Horticultural Society when further details and selections of plants may be obtained. Depend on the Latin name of a plant rather than the Common or Vernacular nomenclature for these vary so much as to be a hindrance rather than a help in many instances.

Illustrations. The illustrations in this book are from actual photographs taken, for the most part, by the writer.

They have appeared in various magazines and I am indebted to the Editors of the Bengal-Nagpur Railway Magazine, East Indian

Railway Supplement and Eastern Bengal Railway Supplement, to the Indian State Railways Magazine, the Review of India (European Association Magazine) and the Agri-Horticultural Society's Journal for favour of reproduction here.

Seasons. A calendar absolutely correct for every station in India can never be written on account of the varied temperatures, rainfall, etc., in this great Continent. To the amateur these difficulties will at first be a great trial but within a year at the utmost, the proper conditions will be discovered and the calendar dates and advice so altered as to fit in.

The Agri-Horticultural Society have issued a perpetual wall *Gardening Calendar*, a copy of which every amateur should obtain. This shows what has to be done month by month and suggests seeds and plants to be ordered well ahead of actual dates for sowing and planting. Supplementary notes can be added to suit local conditions and a valuable "Vade Mecum" be available in a small compass after a year or two.

Blank page. You will find a blank page has been inserted between chapters for notes. This is for supplementary information of local conditions, etc., which jotted down elsewhere is sure to be overlooked but in the book itself is a ready reference at any time.



CASSIA FISTULA
(*Indian Laburnum*)

CHAPTER ONE.

THE GARDEN LAY OUT AND GENERAL HINTS.

Lay out of a Garden. One could write a long chapter on landscape gardening but no rules were ever made which an amateur could follow in every case. Never make a garden too formal, try and follow Nature as much as possible. If the grounds are large enough, have a pergola, tea pavillion, paving stone paths, bird bath, a pool of water and rustic bridge, etc., but not otherwise.

It is not always possible for the amateur to take charge of a garden with which some one else has not been experimenting.

If you merely had the skeleton of a garden you could clothe it as fancy desired ; usually a garden, as originally laid out, is carried on unchanged for years, because it is either too troublesome or expensive to alter it the least bit. In Calcutta the *Garden Competition* inaugurated by the Agri-Horticultural Society has been helpful to the competitors by solving some of the difficulties which make gardening burdensome.

A garden is governed by the lie of the land in relation to the house, work on a simple design, do not over do any one idea. A pergola is all right in its place but pillars in a dozen different parts ruin the effect.

Avoid as much as possible flower beds of complicated geometrical design, anything having sharp pointed corners or curves ; the mali is sure to make a mess of matters at the first opportunity offered, even if pegs and twine are provided for his guidance.

The question of a formal or a natural lay out depends entirely on individual taste and the size of garden. Use your common sense and be prepared to scrap an ambitious scheme for a more matter of fact one. Let the system be "fool proof". This is where an amateur's ingenuity is taxed to its utmost and the brainy one "breaks" away from the standard type of garden.

If you cannot give full scope to an idea do without it, do not attempt an effect in miniature.

“ Make the most of your ground,” does not mean to cram it full of plants and beds of annuals ; grass lawns are restful, and a few shrubs suitably placed preferable to a badly crowded shrubbery.

When to attend to a garden. There is no “closed” season in a garden. If you think you can allow your beds and shrubbery to lie unattended for 3 months and then rush in a gang of labour, dig, manure and plant up in a week or two and obtain a first class garden, you are sadly mistaken.

Gardening depends on doing the right thing for plants at the right time, starting with the sowing of seed, right on till the plant reaches maturity and flowers or ripens its fruits.

What constitutes success in gardening ? Not merely making a plant grow or flower, but obtaining the best results from all plants in the garden. “My mali can grow Carnations perfectly but is an absolute fool as regards everything else”, is often heard. A specialist is of no earthly use to the ordinary amateur and it is much better to grow a poor selection of plants and cultivate those well than attempt rare and uncommon varieties with little success.

What to do.

1. *Improve existing conditions first* and gradually work out a new design, always having a plan at the back of your mind.

2. *Prepare soil by deep cultivation.* Remove stones and rubbish and renew all grass if neglected for any period. In old gardens the careful replacement of soil around shrubs and trees with a good compost to which bone meal and nitrate of soda has been added, will give plants a new lease of life.

3. *Walks and paths.* Never multiply these unnecessarily, make the main drive and paths lead to various important sections of the garden, always having the gradual revealing of beauty in mind. A graceful curve instead of a straight road will often make a marked difference to a garden and when clumps of shrubs are artistically planted, you have no idea how a view is altered. Make the foundations of your roads and paths solid, Khoa or Clinkers rammed down and finished off with smaller material rolled in. Always have your paths higher than the surrounding ground, so that these may not act as drains in wet weather and collect weed seeds to cause you endless bother to clean.

4. *Drains.* This is as important a point in a garden as any other, in fact drainage should be your chief concern. Do not make the drains too severe, in shape a gradual sloped grass scoop is far preferable to a sharply cut channel. Aim at the quick removal of water, for the slower the discharge, the greater the risk of washings of weeds being deposited. Three or four exits into a main drain should be arranged.

5. *Actual planting.* This should be done at a season when plants have the greatest chance of survival. When sap is rising or the atmosphere is charged with moisture, are safe periods, but a plant may also be removed quite safely when dormant. Never take unnecessary risks and leave the minimum of roots when lifting a plant ; be on the safe side and avoid cutting any of the large roots. And then always shade plants in hot dry weather and syringe the foliage in the late evening to further assist the plant. One usually knows whether a plant will live or die by the behaviour of the foliage. Either the plant hardly loses a leaf, and goes straight on, the normal flow of sap being held up for a day or two, or every leaf will turn yellow and drop off ; both these will live. Those that hang their leaves on the twigs and do not fall, but the tips of the shoots fade, droop and thus remain, usually die. To try and save such seemingly hopeless cases, clip the tips, strip off the dead foliage, syringe and water frequently.

What to get. Garden Implements. Many amateurs never worry what the mali uses to perform his humble tasks with and in consequence make-shifts, which are far from satisfactory, or borrowed implements, (worse still), are used. For watering there should be a couple of 2-2½ gallon *Watering Cans* with roses, a *Bucket* too is useful to supplement the watering cans. Have a spare *fine rose* (Haw's patent) with a 1 gallon can for seedling work, to be used only when needed. A *Syringe*, fairly strongly built, will be necessary to keep foliage clean.

Then for digging, obtain a *Kodali* or a *Kodali fork*, which is the more useful instrument, the *Khurpi* for cleaning paths and removing weeds, and the *Nironee*, that piece of flattened iron rod with which most of the pots and beds are forked up. A *Saprang (Sabul)* should be kept handy, this is a *Khurpi* on a long handle for digging holes, etc. To cut branches a *Dhao* or *Billhook*

is more useful than an *Axe*, for though wood can be split with anything from the Kodali to a hatchet the making of bamboo stakes, chopping small branches, etc., cannot be done without a Dhao. A *Pruning knife*, 12" in length, a *Saw*, *stout Pen knife* and *Secateurs*, for clipping small twigs should also be added to the list.

To cut a hedge a strong pair of *Pruning Shears* must be stocked and to trim the edges of grass beds, etc., a pair of *Spring Grass Shears*. The *Lawn Mower* should be "fool proof" and a Ransome, Shanks or a J. P. is preferable to a cheap make, if there is a tennis lawn to cut. Then a heavy *Roller* can be dispensed with, but if a light one can be procured at a cheap price it will save the continual borrowing from next door or hiring one frequently.

If water is laid on, a length of *Rubber Hose*, armoured or corrugated, with *Royles Patent Tap Connection* and a *Boston Combination Nozzle* is suggested, while a *Lawn Sprinkler* prevents the mali damaging the lawn. Malis are not keen on using a *Trowel* or *Weed fork* and make the Khurpi and Nironeo do this duty. They even jib at using a *Garden Rake*, but one should be procured, an 8 or 12 toothed one, and the old fashioned *cocoanut mid-rib Broom* is preferred to any "new fangled idea" one might suggest to prevent the back breaking process of sweeping.

It is no use getting a *Barrow*, for the mali will never use a labour saving device such as this but relapse to the *Bamboo Basket* which will need renewal each month!

It would be well to provide a box in which the implements can be stored, otherwise they will be dumped in any odd corner of the godown.

Pots. Always purchase well baked earthenware pots; sound them before use for often cracked specimens, or half baked ones, are camouflaged with red colour and take in the unwary.

Sizes.—*Four inch* pots are suitable for small annual seedlings, etc., *six inch* for small palms, ferns, etc., *eight inch* pots are the best for single specimen plants of annuals such as Aster, etc. *Ten inch* will contain three *Salvia*, *Antirrhinum* etc., quite comfortably and are also best for tall palms. *Twelve inch* pots are as large as one can safely go in earthenware. After this size a pot is made in two pieces and, where joined, is weak and liable to break.

Hanging pots and baskets.—These are made of earthenware, wood or wire; the last named will be most satisfactory for all purposes. Line with coir fibre or moss and it will contain earth; the selection of plants usually grown will be mentioned in Chapter Twelve.

Seed pans can be obtained in sizes from 10" to 14" and are the best for seed work and low growing shallow rooted annuals, ferns, etc.

Wooden tubs. Oil casks sawn in half and charred inside to remove the oil, are more lasting than made up casks, unless these are prepared of seasoned teak wood. Small wine barrels also prove fairly lasting. Iron drums are everlasting but expensive. Kerosene tins are often put into commission being tarred or painted green and last for years.

Plant supports. This is where the average mali makes a mess of his plants, he either does not stake at all or else uses sticks that are too small or too large. Bamboos are the most serviceable material. Cut lengths of 18", 3 and 5 feet, the bottom, 6 to 12 inches, to be dipped in tar or creosote and the rest painted green. If made of well seasoned bamboo, these stakes will last for years unless slipped into the mali's fire; wire and thin iron rods are everlasting but are lost quite as easily as the bamboo stakes.

Tying material. Raffia fibre is very strong, twine made of sunn hemp or jute lasts but a short while, thin cocoanut rope is better. Galvanised wire should be carefully used, it is liable to cut into the stem of plants and cause more damage than help.

Arches, etc., Use strong angle iron painted green whenever possible, where wood is necessary paint thoroughly with tar or some anti-rot paint especially the parts that go into the ground and those portions that are liable to collect moisture.

Labels. As much as possible avoid using paper labels; wooden or zinc ones, on which the full name of the plant has to be written, are best.

It is much simpler to fix small punched tickets on plants showing a number which corresponds to the full name in your note book. If wooden labels are used paint them lightly with white paint or enamel and immediately write the name with a pencil. For zinc labels use sulphate of copper as ink.

Jaffrey work and wire screens. Bamboo jaffrey work should only be used as a last resort, not only does it collapse very quickly through insect attack and damp rot but does so just when the creeper has covered the screen.

Angle iron and wire netting provides a neat everlasting screen on which the lightest or the heaviest climbers can be grown. Bury a strong type of angle iron, pipe or wooden post at least $2\frac{1}{2}'$ to $3'$ in the ground and not more than 8 feet apart, ram bricks around the base to prevent these uprights being drawn out of perpendicular when the weight of the creeper is felt.

Run a thick strand of galvanised wire at top, bottom, and middle and to this wire on galvanised netting. Use a large mesh for this is cheaper and easier to clean of dead leaves.

Price of commodities and labour. The amateur is often called upon to pay extraordinary prices for earth, manure, etc. Granted that no mali will provide you with correct prices, it is galling to know you are being charged 75 per cent. more than necessary. If in Calcutta or suburbs apply to the Agri-Horticultural Society for assistance but in the mofussil a casual enquiry from neighbours will often put you on the right track. It is impossible to give a schedule of rates which will be of any help to the general reader.

Transplanting. Dig a trench $2'$ to $4'$ deep at some distance from the stem of the plant, say with a $3'$ radius. If the soil is dry soak it prior to digging, and the earth will then bind better. Gradually reduce the ball of earth till it reaches a manageable size when it should be tied together with straw, hessian, or some such material.

Have your pit ready dug, moisten it with water and lower the lifted plant into place, gradually filling in the excavated earth. Make a ridge around the plant to contain water, flood, then to make certain that the bottom soil is also wet, run a bamboo splint down in several places to allow the water to penetrate. Give shade if possible and syringe the foliage at dusk for several days.

Arrange a supporting stake at once according to the height of the tree ; a tree guard at this period will often save the plant from being damaged by careless servants.

If after lifting a plant the earth, by some mischance, should fall away and the roots become exposed, prepare a thin paste of one-third fresh cow dung and two-thirds clay and puddle the root in this prior to planting.

Unless you have an extraordinarily careful mali personally supervise transplanting. The mali's one aim is to get through a job as quickly as possible and should the roots suffer damage or the ball of earth fall away, rather than own up, he will bury his mistakes, confident that "what the eye doth not see, the heart doth not feel."

Large plants might be further assisted to survive by having moss or straw wrapped around their stems and periodically syringed.

No matter how urgent the occasion, never plant in sodden soil, if it is imperative to put plants into the ground during very wet weather excavate the soil and replace with fresh dry earth. No manure and very little leafmould should be used, the addition of sand to heavy clay being recommended and only a basket of screened leafmould to a pit 4' deep.

Potting. When potting place the crocks concave-side down, over the drainage hole and after filling in compost, leave at least 1/2 inch of space from the rim of the pot for retaining water. Small pieces of cinders, brick or gravel on the surface of the pot prevent the soil being washed away and also help to retain moisture and check evaporation. Never use too large a pot for the size of plant as this never does any good. A small sized pot can always give place to a larger size when necessary.

Potting soil should never be used bone dry, always moisten the compost thoroughly before potting but let it be crumbly nevertheless. If this is not done, very often it will be found that moisture has not penetrated below the top inch or two of soil after the plant has been watered.

Watering. Water is the medium which conveys the soluble matter in manure to the roots of the plant and at the same time provides the moisture which has been evaporated by the sun's rays. Excessive watering is a greater mistake than giving a small supply. In hot weather plants naturally require more moisture, see that it penetrates thoroughly, stir the soil deeply and keep the surface broken up. If an impenetrable crust forms only a few surface feeding roots

will be benefitted and these cannot keep the plant in a state of health. Always water before the sun becomes too hot or in the early evening before the cold chills the water.

One good soaking is far preferable to repeated sprinklings, over watering damages the delicate root system and weakens the vitality of the plant so the soil should be allowed to dry before further moisture is given.

Syringing. The syringe is not considered at all important by most amateurs, and yet it makes a big difference to a plant if the foliage is washed regularly. Insects and dust are removed and the cleansed leaf surface is enabled to absorb carbon di-oxide and moisture. By wetting the leaf the tremendous drain on the plant of transpiration is also lessened and sap drawn from the reserve fluid in the stem builds up the plant. The air is cooled and moistened even for a short while and the plant helped. Use a fine jet first of all to wet the surface of the leaf and loosen dust and dirt. Follow this up with a second syringing directed slightly more strongly to remove actual unwanted matter. If syringing is done before the dew dries off it will be more beneficial to the plant. If water alone fails to make much impression on the dirt use a solution of one ounce of soap to a gallon of water.

New arrivals, how to treat them. On receiving plants from a Nursery examine the ball of earth around the roots, one often discovers this to be of stiff clay, which has hardened *en route* to brick like consistency.

During the rains it is worth risking the removal of this material by washing it off and replanting in a more congenial compost. At other times, gently break the ball by pressure of the fingers and plant in light soil, filling in the cracks with sandy soil to induce the roots to leave the hard shell.

Ten Points to remember.—

While soil conditions cannot always be changed, the study of the subsoil often solves a problem. Test holes dug in different parts of the garden may discover a pocket of sand required for digging into stiff clay. The strata a foot or eighteen inches deep is sometimes far superior to the worn out surface earth and deep digging can improve the tilth of the soil.

Wind breaks are sometimes the salvation of a garden exposed to hot or cold winds. This does not mean that a tall hedge is always imperative.

Position should be studied, certain plants like morning sun, others grow in shade, etc., and will never be at their best in the wrong position.

Study the growth and habit of plants, times of sowing, planting, flowering, etc., before carrying out these operations.

You cannot expect half starved, ill conditioned plants to give you the best returns. Feed up gradually with weak doses of manure, but also examine the soil on the surface and deep down.

Avoid weak seedlings or plants, if not strong when procured, pot and feed the plant and transfer it to the ground when sturdy.

Over crowding plants and too many flower buds where size is required, are fatal mistakes. Give a plant breathing space and reduce excessive budlets.

Keep plants growing, a check is fatal and plants recover very slowly. This is particularly the case when buds have just commenced forming or new growth containing flower buds is pushing along.

Daily sprinklings encourage surface rooting which means possible injury to them through extremes of heat and cold, besides there is less labour giving one soaking every few days.

Water early of a morning for preference, always syringe before sunrise or after sunset. The sun often acts as a burning glass on a drop of water and ruins foliage.

CHAPTER TWO.

SOILS & MANURES.

Soil. In compounds which have been levelled off and prepared by a contractor, all kinds of soil will be discovered, depending on the material used for filling tanks, etc. River silt is all right if not too brackish and after a little spade work can be utilised for all plants ; lime this soil to commence with and after a month add leafmould and old cow manure. Where a sticky clay exists, sand will be necessary, the quantity depending on what has to be grown. A clay soil is heavy, when wetted and pressed together it does not readily break apart, and on drying requires some force to break. The addition of sand will reduce this stickiness and make it useable while lime also breaks up this type of soil. A good garden soil crumbles when balled and pressed.

Clay soils can also be lightened with coal ashes, breese, etc. dug in but this should not be used in excess for there is no manurial value in such material and chemical or animal manure must be added as well.

Soil must be in such a condition as to supply oxygen to the roots, maintain sufficient moisture for the needs of the plant, provide the necessary elements of plant food, and dispose of injurious substances excreted by plants.

Therefore the soil must be constantly stirred to a good depth and aerated, humus and organic matter, sand, etc. must be added to heavy clay to enable it to retain moisture, manures given in reason to make up the loss by leaching through heavy rain and what the plant absorbs from the land. Rotation of crops to avoid over exhaustion of soil and the removal of poisonous excretions, is also recommended. Liming, to sweeten land that has become sour through over manuring or water logging, keeps the soil in a workable condition.

Where soils are regularly treated with manure the quantity recommended in this chapter can be reduced, for once the tilth of the soil has been improved, the plant can take up every bit of manure dug in and smaller amounts will be necessary.

Sterilisation. When plants are badly attacked by fungus it is necessary to sterilise soil. Use equal parts of naphthalene and quick lime, dig it in at the rate of $\frac{1}{2}$ lb. to the square yard, water and cover the spot with sacks for twenty four hours.

This is seldom done in India, it is cheaper burying the effected earth and obtaining virgin soil.

Soil test for acidity. Vinegar or dilute hydrochloric acid poured on soil should show an effervesence if there is any lime in the soil.

Or fill a cup with soil direct from the ground without touching it with the hand, make it into a paste by stirring in water with a wooden rod and press a slip of Litmus paper into the centre. If after an hour it is a decided pink in colour the soil is acid, if the shade is faint the acidity is only slight.

What to store.

In the potting shed one should always find :—

1. Leaf Mould, screened fine and coarse but without twigs, half rotted leaves, etc.
2. Rotted Stable Manure in a useable condition.
3. Old Cow Manure, beaten up fine.
4. Garden Soil called chickna muttie, but not heavy clay, earth which has been dug and exposed to the atmosphere and is in a friable condition is wanted.
5. Roof rubbish, lime mortar, and cinders.
6. Sand coarse and fine.
7. Wood ashes and charcoal.

Composts. These mixed in various proportions will give you the composts for all kinds of plants.

1. For the *general run of hardy plants.* Half garden soil and one quarter each of leaf mould and cow manure. For *foliage plants* add a teaspoonful of bone meal per 8" pot. The addition of sand to heavy soil is recommended, while if stable manure is added leafmould and cow manure can be reduced by half. Wood ashes and charcoal added in small quantities to all composts helps.

2. *Fern compost*, one-third each garden soil, leafmould and cinders or rubbish.

3. *Bulbs*, see Chapter Twenty.

4. *Palms* one-third leafmould to two third garden soil.

5. *Chrysanthemums*, see Chapter Eighteen for the compost.

6. *Succulents*, one half cinders (rubbish) and one quarter each leafmould and garden soil.

Mulching. *Mulching* is forking up the top spit of soil with or without the addition of manure. This has the effect of conserving moisture and when leafmould or well rotted stable manure is added to the mulch is of great value to the plant.

Manure. To the amateur the word "*manure*" conjures up the material provided by the mali at certain times of the year to be dug into flower beds and for which a large bill is duly presented. The colour of the manure thus supplied is no criterion, a black looking heavy mould may not be well rotted cow manure at all.

Manure supplies the deficiencies in the soil which are essential for perfect growth of leaf, flower and fruit, and should restore the mineral balance of the soil.

Manure is assimilable plant food for the use of growing plants and should combine with and supplement the natural food supply. Certain manures become immediately available, others take 3 to 6 weeks before the full total food value is exhausted.

To strike the happy medium and know when to manure and with what, presents certain difficulties. All soils are not the same and what is recommended for one garden may not suit another next door. It will only be possible to touch on the fringe of the subject, and the amateur will have to judge for himself after reading this chapter what his garden requires.

When manure is fresh there is always an excess of nitrogen and ammonia and this is not liked by bulbs; leaf types of vegetables prefer a mulch of fresh to old manure, so do Canna.

How to prepare plants for Manure. So as to get the best results from applications of manure, withhold water from either pot plants or those in the ground for a few days according to the season

of year ; fork up the soil carefully and allow it to dry. The roots of the plant, however, must not be damaged. Water with liquid manure till the soil can take up no more and then two days later, continue with ordinary watering for a week when the liquid manure dose can be repeated.

Once steady growth has started, stop manuring, commence again when the buds show and when these are on the point of bursting, discontinue entirely.

Liquid Manures. To every 10 gallons of water put six seers of fresh *Cow manure* in a coarse cloth or gunny bag and sink it in a cistern ; shake the bag about after 24 hours, but do not use the liquid, which should have become the colour of weak tea, for 2 to 3 days. If the manure is merely dumped into the water and rotted for 48 hours, strain carefully before use. Dilute $\frac{1}{4}$ pint per gallon of water. Oil cake is stronger and requires a longer period to rot, it is rather offensive when used. Both these manures are excellent for annuals, Chrysanthemums, Roses, etc. Horse manure may be substituted for cow manure.

Fish Meal, Guano, Farmyard manure, Sheep manure, etc., should be used at the rate of an ounce to a gallon of water, and soaked for 24 hours.

These liquid manures can be fortified by the addition of an ounce of *Sulphate of Ammonia* or *Nitrate of Soda* to 1 gallon of manure water. This concentrated liquid should be diluted at the rate of one gallon to 3 of water. If a couple of ounces of *Soot* and a pound of *Fowl manure* can be added to the stock solution referred to above, a first rate liquid manure is the result.

For quantities of chemical manure required in a liquid form for plants see the paragraph on Chemical manures and Recipes for fertilisers. Half an ounce of Chemical manure per gallon of water is the safest quantity to use.

Green manuring *i. e.*, sowing of one of the pea family, Dhaincha, Cow Pea, etc., and digging in the plant before it flowers or shortly afterwards, is a method of adding Nitrogen to the soil much practised for Tea, Coffee, etc.

Simply broadcast the seed in March-April and allow it to grow till just before the rains, when the plants should be cut down and the

leaves, root and stem dug into the soil. After a couple of heavy showers the unrotted stem and roots may be removed to prevent white ants being attracted.

Organic or Natural Manures Organic manures such as Cow Manure, etc., are comparatively safe containing as they do 34% of nitrogen in Cow manure and 4% in Oil Cake as compared with 15-16% in Nitrate of Soda and 19-21% in Sulphate of Ammonia. You will therefore see that repeated doses of Cow Manure are safer than any chemical manure.

The chief organic manures are *Cow manure* or "*gobur mattee*" and Horse or Stable manure, "*ghora ke ledi*". The latter is best for heavy soils, as it provides humus as well.

Bird Guano and *Farmyard manure* are concentrated plant foods, excellent for vegetables and pot plants but both must be used in reason.

Oil Cake is one of the best quick acting nitrogenous manures and cotton, linseed, castor, mahwa, or rape cake are used.

Fish Meal or *Fish Scrap* too is good so is *Dried Blood*.

Kitchen Refuse is excellent for digging into shrubberies, and if properly rotted for a year to 18 months it will be found to contain a large amount of nitrogen, potash, etc.

Leafmould (Humus) has little manurial value but lightens soil and is a most useful medium for raising seedlings and assisting the root growth of small delicate plants. It should never be used pure except for seed raising and then always screened and dried in the sun to free it from grubs, etc. Half rotted pieces of wood and leaf also attract white ants.

One can never judge the value of soil or manure by weight or colour. Leafmould should be light about, 40-60 lbs. per cubic foot, and the purer the material the lighter will the soil be. Mangoe leaves give the best mould, Casuarina, Bamboo, and Tamarind leaves should not be used.

Lawn Grass is also excellent if rotted in water and the liquid used but it usually goes into the leafmould pit.

The application of *Wood Ash* provides potash in small quantities for 1 lb. of ash will give a little over 1 oz. of potash.

Stable Manure for general digging into soil apply 20 cubic feet to 25 square yards but where Canna are grown, double this amount.

The above quantity applies also to *Kitchen Refuse*.

Farmyard Manure, mixed with ashes and lime in small quantities, should be forked in at the rate of 4 ozs. per square yard, *Fish Meal Oil cake and Guano*, 1 to 3 ozs. per sq. yard if used dry.

Chemical or inorganic manures. Just a word of warning before we go into this subject. Remember too much chemical manure burns the tender roots of plants. Inorganic salts are for the immediate use of the plant and if continued without humus will make the soil unworkable. Never apply when the soil is dry, always water it in and do not let it come in contact with foliage. A safe precaution is to use chemical manure one week and a natural one the following.

What not to mix. Trouble is apt to arise by mixing manures, for Chemical action detrimental to plant growth may be set up. Lime should not be mixed with Dung, Guano or Sulphate of Ammonia. Basic Slag never used with Nitrates, Sulphates or Superphosphate nor Nitrates with Superphosphate.

Nitrogenous. *Nitrate of Soda* is quick acting, dissolves very quickly and should be applied to growing plants. It combines with free potash in the soil and does not cause soil acidity. *Sulphate of Ammonia* is somewhat slower but has more lasting effects and can be applied before the crops are in growth, it produces rapid and succulent growth and healthy green foliage but too much will reduce fruiting and flowering, making foliage large and sappy. These manures are readily soluble in water and are powerful stimulants. The usual application is 1/2 oz. to a gallon of water or dry 1 oz. to the square yard.

Potash Manures, applied chiefly as *Sulphate, Nitrate or Muriate of Potash*, are good for Potatoes, Beet, etc., and should be applied at the rate of 1 cwt. to the acre dry, or 1 oz. per square yard; as a liquid manure ½ oz. per gallon of water.

Potash manures are very good for vegetables, imparting good flavour, and size, plant growth is hardened, vigor supplied to flower and sugar and starch to fruit. The soil should however contain lime to obtain the best results from Potash.

Phosphatic manures comprise *Bone meal, Superphosphate, Phosphate of Potash and of Ammonia and Basic slag.* The phosphates of potash and ammonia are applied in a liquid form, half ounce to a gallon of water for Tomatoes, etc. Bone meal should be applied at the rate of 8 lbs. and Superphosphate at 2 lbs. per 30 square yards 3 weeks before planting. Phosphate manures, must be used with nitrogen and potash and are aids to nutrition, producing fruit and early maturing. Superphosphate accelerates natural growth and used in a liquid state is an universal fertiliser, deepens colour of foliage, strengthens seedlings and makes them less liable to damp rot.

Lime. Very often all that is lacking in well manured soil is some agent to break up a chemical combine and this is where lime is of use. While actually not a manure it sets free manures which may be inert and makes plant food immediately available. It digests, as it were, plant foods especially potash, flocculates clay, and prevents clay soil cracking. It counteracts acidity, and forms a base on which other acids may combine. Lime is essential to decomposition and assists bacteria thus aiding the nitrification of soil. Gardens should be thoroughly limed every 3 or 4 years, a light dusting of Crushed Limestone or Slaked Lime spread over the bed and dug in at least one month before the application of manure, every year is not out of place where there is heavy rainfall. Never use manure and lime together. The quantity applied should be at the rate of 2 to 4 ozs. per square yard for vegetable or flower beds.

Lime plays an active part in reducing Club root disease, fungi and insects.

There should always be about 1% of lime in the soil for good plant growth. Crushed Limestone (Carbonate of Lime) is safest, can be applied anytime, but Slaked Lime must only be used during the dormant period or when beds are empty.

Recipes for Fertilisers. To give any recipes to an amateur is not considered safe, for various considerations must be taken into account when preparing a balanced manure. But provided the quantity used is not exceeded, the following fertilisers are recommended.

General Manure.

This is good for Vegetables, Annuals, and particularly Sweet Pea and should be applied at the rate of 1 oz. per sq. yard.

4 ozs. each Sulphate of Ammonia, Superphosphate, and Sulphate of Potash.

Do not repeat the dose. For liquid manure use $\frac{1}{2}$ oz. per gallon of water.

Lawn Manure.

1 lb. Sulphate of Ammonia, 3 lbs. Superphosphate, 1 lb. Nitrate of Potash.

Five pounds for 30 sq. yards or 75 lbs. per Tennis Court, add to leafmould and sand and use once a month during the cold weather.

Pot plants.

2 ozs. Sulphate of Iron, 4 ozs. Nitrate of Potash, 4 ozs. Phosphate of Potash, dilute in 8 gallons of water and use once a month.

How to tell what chemical is lacking in the soil. The condition of foliage, fruit, etc. often helps one to diagnose a case and supplies the key to the difficulty.

Foliage.

1. Lack of Potash or an unsuitable ratio between nitrogen and potash usually results in leaf scorch, flaccid foliage, hollow stems and bad shape of flowers. The plant is often normal at the commencement of life but growth slows down and foliage soon becomes a dull green. Leaves turn downward and inward and get corrugated; they may also become spotted, the stalk, midrib and veins being deeper green and margins pale green.

2. Lack of Nitrogen gives sparse foliage and that a pale yellow green in colour.

3. Lack of Phosphates gives a bronzed appearance to the foliage and purple spots also appear; leaves are scanty and form only at the tops of the branches.

4. Lack of Calcium turns the foliage larger than usual and persistent much longer than normal, in deciduous varieties.

5. Lack of Magnesium shows at full growth when the leaves are blotched and tissues dried or the tips of leaves get pale yellow. The defoliation is also precocious.



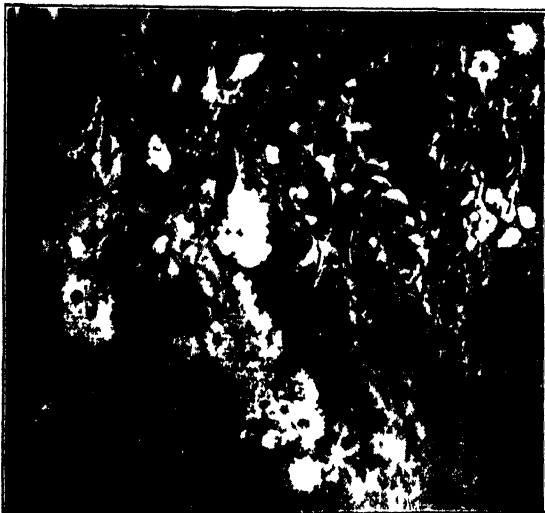
Quassia amara.
(Page 137.)



Mussaenda erythrophylla & frondosa.
(Page 134.)



Cassia alata.
(*Page 139.*)



Lagerstroemia laingae.
(*Page 133.*)

6. Lack of all mineral constituents makes the foliage small and sparse, while the leaves are apt to turn red. This condition also causes early defoliation.

7. Lack of iron, the leaves become pale green or whitish.

Fruit.

1. Lack of Nitrogen gives small highly coloured fruit, the skin lacking polish, and the flesh being white, hard and acid.

2. Lack of Phosphates causes soft fruit {to form, of unpleasant flavour and wanting in sweetness.

Root and Bark

1. Lack of Potash produces small stunted growth and the fibres are lacking.

2. Lack of Magnesium or Calcium makes the tips of roots blackened.

3. Lack of Phosphates is shewn by the growth being curtailed.

4. Lack of Potash and Nitrogen, the growth is still less and bark pale coloured.

Other Symptoms.

There are however several conditions of growth, which though put down to lack of manure, are often due to wrong culture.

Here the amateur would be well advised, before adding a missing element to the soil to cultivate it deeply, examine the situation and the plant and make certain the condition of growth is not merely due to careless treatment.

For instance, Chlorosis, the pale condition of foliage, might be caused through lack of iron, yet an acid condition, escape of coal gas in the soil or poisoning with soluble salts often has the same effect.

A weak dose of Sulphate of Iron $\frac{1}{4}$ oz. to a gallon of water is very helpful to plants suffering from chlorosis.

Insects too may absorb so much nourishment that a general weakness is brought about.

CHAPTER THREE.

PROPAGATION.

A short note on the various systems of propagating plants may be acceptable to the amateur who wishes to increase stock of some particular variety, at the same time it will serve to check up the methods employed by the *mali* whose attempts at times are very crude.

(1) *Cuttings* are the simplest method of propagation but merely planting out pieces six to eight inches long in the ground will not do with all varieties.

Cuttings root better when firmly planted in light porous sandy soil than in any other medium. Sever below a node with a slanting cut leaving 2-3 eyes per cutting and reduce the leaves to just a couple or so. Hard wooded cuttings should be smaller than those made from soft herbaceous material. Do not bury the cutting more than an inch and firm the soil.

Always plant cuttings while growth is dormant and before the growing season. Remember that plants made from cuttings of the extremities of a bush or tree will flower earlier than those made from the lower growth.

When cuttings are placed in close contact with a crock, or the sides of a pot, root making is induced much quicker than otherwise.

Certain cuttings strike better from new growth, for instance the *Duranta*, others from mature stems, but as a general rule a cutting of half matured wood is safest to use. Some varieties of hard wooded plants are slow to make callus and fail to strike if treated in the ordinary fashion. Break a twig of half matured wood but let it remain attached to the plant. A callus, which is the healed scar that seals the base of the cutting and from which roots spring, will form in a week or two when the cutting can be severed and planted in sand.

Cuttings taken with a heel, *i.e.*, pulled off the main stem, are often successful where other cuttings fail. Merely trim off the rough wood and bark.

When dealing with *Acalypha*, *Croton*, *Hibiscus*, and such hard wooded plants make your cuttings, trim the base cleanly and plant on a slant in a shady corner, a couple of inches apart using sandy soil if possible; *Plumeria*, *Poinsettia*, *Oleander* and those that have a milky juice, should be laid aside, after preparation, for an hour before planting.

These varieties are best propagated during the dry months; all others readily root in the rains. The *Lagerstroemia* does best if planted in January or early February. Cuttings of succulents, *i.e.*, *Begonias*, *Cactus*, etc., made from the leaves or stem are struck during the winter months for preference and given very little water until the callus has formed. Just keep the soil moist and syringe in hot weather once a day.

Conifers and such plants which exude a milky juice, should have the cut ends dipped into hot water for a couple of seconds so that the gum or resin may not form a hard callus and interfere with production of roots. But only plunge, do not keep for any length of time. Cuttings dipped into *Collodion* are sealed very effectively.

(2) *Gootie*, *Marcottage*, or the Chinese method of grafting, is practised in the propagation of *Crotons*, *Dracaenas*, *Litchis* and a number of other plants. This consists of removing a ring of bark an inch or two in length and tying on a ball of earth which is kept in position with coir fibre. The actual operation requires cutting through the bark only sufficiently to remove this ring intact. The system is best practised during the rains when no watering is necessary though a gootie can be made at any season if the ball of earth is kept moist. There are some types of stem that do not respond to the mere removal of the bark but require the cambium to be scraped as well; after taking off the ring of bark the knife blade should scrape the slimy surface below, without hurting the actual wood. This scraping should only be practised when the ordinary system has failed and *Guava*, *Litchi* and *Jamrool* are three plants that need this attention.

The compost for gooties should be fairly porous but not so sandy as to be washed out of the coir covering by rain or too clayey so as to harden to brick-like consistency in hot weather. The addition of a small quantity of well rotted oil cake to the soil is recommended where very hard wooded types, the *Litchi* for instance, are gootied.

When tying on the coir, obtain the longest fibres, bind them an inch below the cut, firmly to prevent slipping, mould on the compost around the cut, draw the fibre upwards and bind it above the ball of earth wrapping the twine once or twice around the ball to keep it in position. A fair sized lump of earth should be used forming a ball about $3\frac{1}{2}$ " to 4" in diameter.

(3) *Division of Offsets.* This applies to Chrysanthemums, Ferns, Michaelmas Daisies, etc., and hardly requires explanation. It is only necessary when dividing the main clump, not to make too many out of a bushy plant. For instance an Areca palm of say 12 stems should be split into 2 or 3 plants only. Shake most of the earth off the roots and press the stems apart. Use a sharp knife or saw and perform the operation either in wet weather or at a season of the year when there is moisture in the atmosphere. Bulblets of Tuberose, etc., are easily broken apart. The off sets of Chrysanthemums, Michaelmas Daisies, etc., are divided at their respective seasons of replanting.

(4) *Root Suckers* are adventitious buds formed on the roots and provide a method of easy propagation. Never propagate a tree that is a graft in this manner, for the root suckers will be those of the stock, possibly a very poor type compared with the graft. *Ratoons* or *stem suckers* are the plants produced from the base of the stem and division of these increases stock.

(5) *Layer.* There are many plants slow to strike if propagated by cuttings or gooties but which root easily when layered. In this system the stem of the plant must first be made supple and then bent into a pot to fix the position of the cut. A ring of bark is removed or else the under portion of the stem is cut upwards toward the growing tip half way through the stem, and to the length of an inch or two. When the stem is pressed down the cut portion opens out, and should lie in the centre of the pot. Should the stem be of a brittle type, merely press the knife blade through the stem and insert a small stone or piece of wood to keep the cut portion open. Sometimes merely a notch made in the stem in place of the tongue is sufficient. For compost use a light soil and let the cut stem be at least an inch or so under soil, held down in position by bamboo pegs.

Place a brick on top of the pot to prevent the branch rising in high winds and as a further safeguard tie down the branch to bamboo

holes, at least an inch to two inches in depth. Over this spread a layer, to the depth of an inch, of coarse cinders or coarse screened soil the size of coffee berries or peas. Fill the pan up to within half an inch of the top with two-third sifted leafmould, and one-third garden soil which should be pressed down so that it will not sink when watered. Then dust on a quarter of an inch of finely sieved leafmould. Leafmould should be dark in colour and light in weight about 40 to 60 lbs. to the cubic foot. Only during the wet months is it advisable to add more than one-third of soil; if you use pure leafmould you will get the best results, but seedlings must be lifted quickly before too many roots have formed. If the garden soil is heavy add one-fifth part of sand.

For vegetable and annual flower seed raising the addition of one part old powdered cow dung (at least two years old) and one part of wood ashes to six parts leafmould tends to give stronger seedlings.

Testing seed. To test seed for vitality, lay a sample few between damped blotting or asbestos paper in shallow earthenware pans and keep moist. In 3-8 days the seed will show whether there is life in it or not.

Actual sowing.—Before sowing, damp the soil slightly, work it up with the fingers, and level off.

Always scatter your seed thinly. Those seeds that are dustlike should be mixed with twice their bulk of sand to ensure equal distribution, Phlox, Verbena, etc. can be sown at correct distances apart after a little practise. Press larger seed into the soil before sifting on the fine top dressing which should only just cover them.

Watering. Water with a fine rose once a day, the late afternoon or early morning are suitable times; keep pans covered with hooglah mats all day from 8 A.M. to 4 P.M. until the seed germinates. These mats should not be less than 3 feet away from the seed pans.

Seedlings. As growth appears the pans should receive a little sunlight which should be daily increased, till by the time the seedlings are an inch high, they are able to stand the full days sunshine without fading; this will make them sturdy. If the seedlings show signs of wilting under normal conditions, it will ten to one be found that the soil has become caked and water is not

penetrating below the top half inch of soil. The pan should therefore be gradually lowered into a tub of water up to the rim and the moisture allowed to penetrate from the bottom upwards.

The soil in seed pans should be carefully loosened with a bamboo splint when germination is delayed.

The above hints apply to seed in general but certain fruit trees, and others which do not transplant well, should be sown singly into 4 inch pots. Remember that all seed do not germinate within a few days or even a couple of weeks; some varieties take a year or more to come up, Roses are an instance, that comes to mind. It is advisable when tossing out the soil of an empty seed pan, to spread it on a cultivated border where results can be collected if germination takes place.

The raising of Orchids from seed is not practised in India as it is a tedious business and gives poor results, for when raised the seedlings take eight to ten years to flower. Fern spores (which are not seed by the way) can be sown on a bed of cinders or roof rubbish which has lain exposed to rain for sometime, and is covered with a green lichen-like substance. On this medium fern seedlings come up very well.

To assist the germination of hard seed such as Acacia, Canna, etc., very often the seed is soaked in warm water and kept moist for 2-3 days. Placed in fermenting cow dung for a couple of weeks also permits the hard shell of Cassia, etc. to be softened. Soaking in a weak 1-500 solution of sulphuric acid or formic acid is another method practised and 2 drops of Chlorine in 2 ozs. of water provides a solution that will soften hard seed.

Seeds of Aquatics are planted on tank earth, and covered with leafmould but kept under water which should be at least one inch above the pot.

9. *Forcing* is not practised very much in India. The usual practise is to arrest growth by artificial wintering, *i.e.*, withholding water, then at the desired season heavy flooding and warmth rushes along growth and flower bud. This principle is not always practicable on the plains and can only be tried within small limits with a few bulbs such as Hyacinths, etc.

CHAPTER FOUR.

PRUNING.

Many amateurs fail to improve the conditions of their plants by neglecting this simple but important operation. It is really the fear of using the knife at the wrong period of the year or removing the wrong portion of the plant that deters most people from pruning.

One general rule, however, cannot be given for the pruning of all plants, as each section has its own particular season and method.

What is pruning. Under this head we must bracket the removal of small and large branches, spent flower spikes, leaf or fruit buds, cutting of roots or a portion of bark for the various reasons shewn in the next paragraph. The mere clipping of tips to keep a plant in shape can be performed quite safely at nearly any season of the year, but pruning is more than this and must not be attended to in a haphazard fashion.

There is this hint however for the amateur, never leave the operation to the mali. This son of the soil will hack the branches irrespective of season or variety and do more damage than good. A pruning knife in the hands of the mali is a dangerous instrument,—an instrument of destruction, for he can never judge the size of branch to cut or will do it in so careless a fashion that the jagged ends and split stem will harbour the very disease you desire to avoid.

Why to prune. Pruning, except when it is practised for reducing the size of a bush or giving it shape and form, is usually carried out to assist flower or fruit production. Every tree does not require to be pruned.

Where mere shortening of growth is necessary, trace back a rampant branch, and remove it from the base. New growth will then form which will fill any gap opened up. Branches should also be thinned where plants form dense growth and prevent air and light reaching the centre.

Diseased, dying and dead wood must always be cut out on discovery, anytime; remove the branch if possible, below the actual dead wood. Dry wood is a menace, attracting fungus and insect pests,

Pruning concentrates vigor in certain parts of the tree or bush and produces the necessary "push" required for fruit or flower buds. An evenly balanced tree is also obtained by careful pruning, while the quality and quantity of fruit may be improved by judicious removal of unwanted growth. Pruning also facilitates cultural operations such as fruit collection, digging around the plant, etc.

When to prune. As a general rule this should be done when a plant is dormant and just before the growing season, a deciduous shrub should be pruned at least a full month after leaves have fallen. The sap has by this time descended and new shoots will not sprout immediately it is cut back. Roughly the season of greatest dormancy is December-February. Trimming of shoots, tipping, etc., can be carried out in the Monsoon when growth is being made.

By pruning at the wrong time of the year the very reason for the removal of growth may be defeated.

For fruit and flower production notice when the plant blooms, this will give you an idea when to prune.

Should flowers form on new first year shoots, prune when deciduous *i.e.*, November-February. Spring and Summer flowers are produced on the previous year's growth which should therefore be pruned shortly after fruiting or flowering so as to allow good strong growth to be made for the following years bloom.

Evergreens, particularly those grown in cooler climates, should be cut back in Spring.

The removal of spikes of flower immediately they have finished blooming will often cause a second flush to appear. Never prune a plant lately transplanted or one that has already started into growth.

Winter pruning, to remove mature growth, is carried out when the plant is dormant and causes strong new shoots. Summer work is limited to shortening of branches, when flower buds show and the suppressing of laterals to throw vigor into fruit.

How to prune. Use a sharp secateur with double cutting blades or a keen edged pruning knife for thin stems, for larger branches a saw will be required; but never make a jagged cut or break the stem. Prune with the idea of keeping the inside of the plant clear of thin stems and therefore whenever possible cut down to an eye pointing outwards. Any matted growth should be cut out.

Make a frame work on which to work, do not be haphazard about it.

Note that leaf buds are usually more pointed than the rounded fruit buds and when disbudding do not remove all the buds at once, do this gradually over a period of several days ; this applies chiefly to fruit trees.

Pruning need not be practised to any great extent once the tree has grown into proper shape and above all avoid drastic chopping of branches for heavy pruning is devitalising to small plants.

First cut off all dead wood, diseased and thin growth, then pruning can start. Always remove shoots that end in blind growth.

Cut clean above a bud in an upward direction, paint over the cut surface with a lead paint or tar and thus avoid future trouble with disease.

Root Pruning. When fruit trees form heavy growth to the detriment of fruit production, root pruning is often resorted to. A trench is opened up around the tree 2 feet deep and 3 feet away from the trunk. Some of the larger roots are cut back and the trench filled in, a couple of baskets of lime rubbish being added. Roots that penetrate straight down into the soil, in addition to anchoring the tree also provide moisture in great abundance. The idea of root pruning is to remove some of these deep going roots and to induce a mass of fibrous surface roots to come into action and absorb manure laid down at the surface. But all the anchor roots must on no account be cut for then heavy winds would soon blow the tree over. Root pruning is best done in November to January and should be a last resort when the plant does not respond to manuring and ringing of the bark.

Ringing or Girdling. Though this can hardly be called pruning, the idea underlying the treatment is the same. By removing a quarter to half an inch of bark from a stem an inch or more in diameter or tying wire or string so tightly as to bury itself into the bark, the ascending sap is stopped and the substances which should descend to the root as reserve are collected and form a callus. The following fruiting season flower buds will appear in place of only foliage ones, provided of course that the plant has reached a fruit bearing age. Ringing should be done during the Monsoons so that the exposed

portion may be covered with a callus. If wire is used see that this is removed after 6 months.

Effects of bad pruning. Too severe a pruning gives the plant a shock; an old bush of Hibiscus if pruned drastically will nearly always die, on the other hand if one large branch at a time is removed and new growth allowed to take its place, the entire bush may be regenerated in time. Frequent pruning or removal of foliage does no good. Cannas, for instance, do not benefit by the reduction of leaves, neither is the vigor of the plant nor the size of the flower improved.

What to prune. Fruit Trees. Mangoes, Litchis and most of the tropical and semi-tropical fruit trees are not regularly pruned; if the branches get matted it is a good plan to thin out the centre of the tree. "Dying back" must be dealt with as soon as noticed and Indian mistletoe (Banda) should be cut off too.

Detailed suggestions regarding pruning are given under this heading elsewhere, but Phalsa (*Grewia*) sends up strong shoots in time for fruit bearing and can be pruned regularly in December. All the Citrus need to be cleaned of interlaced growth, pruning is seldom necessary unless the bushes have been neglected for many years.

The imported type of fruit trees such as Peach, Plum, etc., bear on young, or old wood and this is where one has to be careful when pruning, for the removal of the wrong branches will defeat the end of the operation. See Chapter Twenty Eight on Fruit Trees for full details.

Other Trees. The removal of side shoots compels a strong main stem which is essential, thin out weak interlaced growth to form a good head and cut off dead and dying twigs, as well as the finished flower heads, or seed pods.

Cassia nodosa recovers quickly after branches are broken off in a storm and can therefore be safely pruned to shape, *Acacia moniliformis* can also be "headed back" with safety.

The same applies to *Peltophorum* and *Acacia Farnesiana*. Other varieties that are pruned to hedge form are referred to under Hedges, Chapter Eleven.

Among succulents we need only refer to two which can be cut back to form bushy growth, *Aglaonema* and *Dieffenbachia*, though this operation may not be pruning.

Roses. The pruning of these plants is dealt with in Chapter Seventeen.

Shrubs, such as *Poinsettia* and *Lagerstroemia indica* type can be cut down to 6"-9" every year and will throw up strong stem, 5'-8' in height. The former should be pruned in March, a second time in June-July and tipped in September. *Lagerstroemia* should be cut in January during the short season of rest. *Acalypha*, *Panax*, *Eranthemum* and other foliage shrubs of rapid growth can be reduced in height but this should not be done after July. *Barleria* can be pruned low immediately after flowering in December and if a bush or hedge 2½'-3' high is required, it can be pruned early in the rains and once again in September to 2'.

The pruning of Hedge varieties such as *Duranta*, *Lawsonia*, *Hamelia*, *Ligustrum*, etc., is discussed in Chapter Eleven.

Cestrum and other rampant growing types can be pruned drastically any time but gradually replace old wood with newer growth.

Crotons, except where a compact hedge is grown of such varieties as *Jacksoni*, *interruptum*, *maculatum* *Katoni*, etc, should not be pruned too severely. The narrower leaved types bush better than those with large foliage.

Hibiscus will not stand heavy pruning regularly but old wood can be entirely replaced in a couple of years by careful removal of stems.

Ixora too, though better able to stand pruning than most plants, should be dealt with lightly and entire branches removed from the base rather than pruned short and frequently. Hedge types *i.e.* *coccinea*, *stricta*, etc., are not so delicate about being cut annually.

Caesalpinia pulcherrima can be cut back quite heavily and will send up stronger shoots in consequence; prune down just before the rains to a couple of feet from the ground.

Mussaenda corymbosa which is deciduous, should be pruned back in December-January.

Argyrea campanulata is very obliging in the way new strong growth follows pruning. If cut back twice or thrice a year, the bush can be kept within bounds and flower nine months out of the twelve.

Dracaena fragrans and *stricta* should be cut back as the rains break and *Daedalacanthus* when the flowers have faded in March.

Oleanders do not like being touched with the knife and fail to flower, in lower Bengal at any rate, till the new growth has reached a height of 5'-6' again.

Plumerias too if cut back at all when deciduous, fail to produce strong enough growth to flower the first year. Prune these after flowering.

Climbers—Heavy varieties such as *Beaumontia*, *Echites*, etc., should have thin short spurs removed, new shoots which bear the flower being thus induced to form, receive all the nourishment which otherwise would be lost in leaf.

Antigonon is quick growing, if pruned back to the stems of a finger's thickness in October will give flower by December; if again cut back in March-April it will flush as the rains break.

Bignonia venusta should be cleaned immediately after the flowers fall, thin weak growth being cut out; *purpurea* should on no account be touched, but *magnifica* and other heavy types benefit by cleaning and pruning.

Bougainvillea can do with fairly severe pruning of short interlaced undergrowth. A glance into a bush or climber of *Bougainvillea* will show any amount of dead or useless twigs which are far better taken out. The heavy *Ipomea*, *digitata*, *palmata*, etc., can be cut back regularly once a year at the period when the plant is deciduous or nearly so. *Jacquemontia* on the other hand should be replaced every 3 or 4 years rather than pruned.

Clematis paniculata can be cut to ground level when deciduous. The new growth made is usually strong enough to bear flowers the first season.

Jasmine and other light growing climbers seldom want attention. Tip back weak growth and cleau. The *Honeysuckle* does not like the knife but the thin stems should be thinned out.

Quisqualis is a rampant type that delights in being dealt with severely, never cut down to ground level but replace matted growth with new strong stems.

Porana can be cut back after flowering, to within a couple of feet of the ground and will be ready by next flowering season to bear as profusely as ever.

Tecoma radicans should be dealt with carefully. The climber naturally prunes itself. A certain portion falls off when deciduous leaving the main stem from which the new shoots branch. If grown as a standard, when deciduous take off all growth from the spot where the branches sprout, and cut off all thin weak shoots that form later on.

Thunbergia grandiflora is one of those rampant varieties that can be severely cut back. Prune just before the rains to the thicker portions of the stems.

Disbudding. Removal of extra buds from Carnation, Zinnia, Antirrhinum, Chrysanthemum, Dahlia, etc., will have the effect of increasing the size of those flowers remaining.

It is advisable, however, not to disbud too drastically, remove a few buds at a time and when they are still small so that the extra sap can go into the reserved few and build up a better flower.

The removal of *Lagerstroemia* flower sprays immediately the last flower has faded will often induce the formation of secondary flower spikes. Seed pods should never be allowed to remain on any plants unless reserved for seed purposes, more flowers and stronger growth can be induced by the removal of the pods which sap the strength.

CHAPTER FIVE.

INSECT PESTS AND PLANT DISEASES.

"The ills that plant life is heir to", is another subject about which the amateur is sadly "at sea". The "poka", in reality, or only in the mali's vivid imagination, which destroys plants is seldom eradicated. Caterpillars are permitted to pupate, produce the butterfly or moth and carry on the cycle of life to the detriment of plant growth. And the pests that infest a garden are legion. In this chapter the fringe of the subject has been merely touched.

The greatest difficulty which faces the amateur is perhaps the correct diagnosis of a case. It is simple where leaves or seedlings have been eaten but some of the minute aphid damage foliage and disappear, the suspicion then points to a fungus and yet fungicides prove useless. Examine a plant very carefully for insect pests.

Again certain conditions of soil and climate predispose a plant to infection and disease. A fungus delights in damp weather and excess of moisture favours the disease. Though the spores yield to sulphur yet the plant must be kept dry and not given just the ordinary watering.

A spray applied during wet weather, no matter how efficacious the recipe may be, is of little use when a shower of rain washes off the poison half an hour after application.

It is quite in reason to place your finger on the moth or butterfly whose caterpillars destroy certain plants. But here comes the rub, how to describe the creature in simple language to make it easily recognisable. Latin names are debarred, and "common names" not as commonly known as they should be. Therefore we suffer some moth to live, little knowing what destruction its progeny will cause in a short few weeks to plants in our garden.

Where to look for them. *Underground.* Most of us have discovered the hole in the ground hidden under a pile of finely excavated soil. This is the *Cricket* and his nocturnal habits allow him free access to the tender seedlings close to his lair. A tea spoonful of carbon bisulphide is the quickest death but flooding succeeds in bringing him out. The *grubs* of various beetles, white

unwieldy creatures, that ultimately develop into the *Cockchafer* in particular, are introduced in half rotted cow manure, and are only encountered when a plant in full leaf or flower, shows signs of fading. Turning over the soil will soon discover a white grub with a black head. Only well rotted manure should be used, even then it should be exposed to the sun. If you suspect the grub is at work water in a 1—10 per cent. solution of salt or 1—20 per cent. solution of carbolic acid.

Eel worms (nematodes) attack the roots of plants which become knotted and the foliage gets leaf curl. Lime the soil and if possible change the plot. If you use carbon bisulphide fork up the soil and spray at the rate of 3 ozs. per sq. yard laying a tarpaulin or gunny sack on the surface to prevent the fumes escaping too quickly.

Earth worms. Tennis Courts and seed beds suffer most from the worm casts on the surface. Corrosive sublimate $\frac{1}{2}$ to 1 oz. to 15 gallons of water, or sulphate of copper 1 oz. to 2 gallons of water or even quick lime 2 lbs. to 15 gallons of water are certain remedies which will bring the worms to the surface. Note, only use the clean liquor from lime water. A dessert spoonful of phenyle to 2 gallons of water for every 4 square yards is also a simple remedy. Proprietary mixtures are offered of which Wormex and Worm Eradicator are excellent. Fresh mowah meal applied at the rate of 15 lbs. per 1,000 sq. feet also brings worms to the surface.

Worms in pots. A tablespoonful of Sulphate of potash to 3 gallons of water watered in or clear lime water will remove the worms.

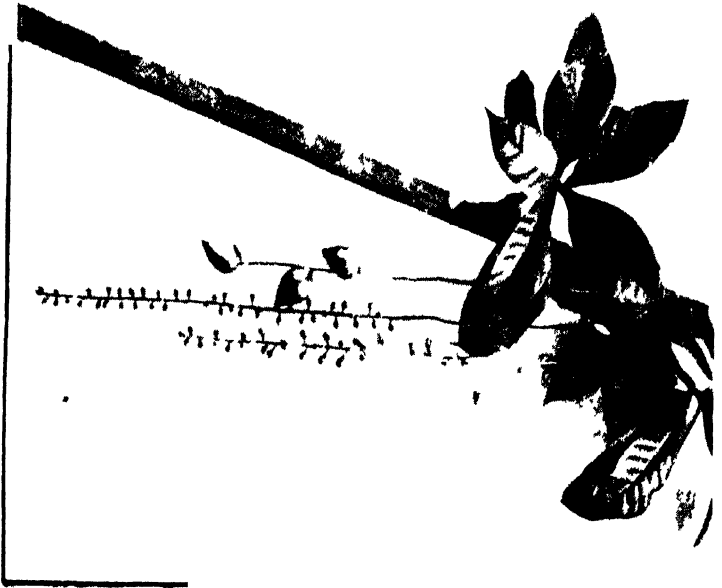
Above ground. Ants.—Red or black. Attract them to one spot, preferably into a chatty or empty pot in which molasses or a bone has been placed, and pour on boiling water; Kerosene oil or Carbolic acid 1 : 20 per cent. solution is also good poured down the runs. Half a tea spoonful of carbon bisulphide squirted into the ant nest with a fountain pen filler, and plugged with clay, will kill as many ants as the fumes reach for the gas will penetrate to the furthest excavations. The application of a lighted match drives the exploding gas deeper but grass and plants in the vicinity are liable to be singed.



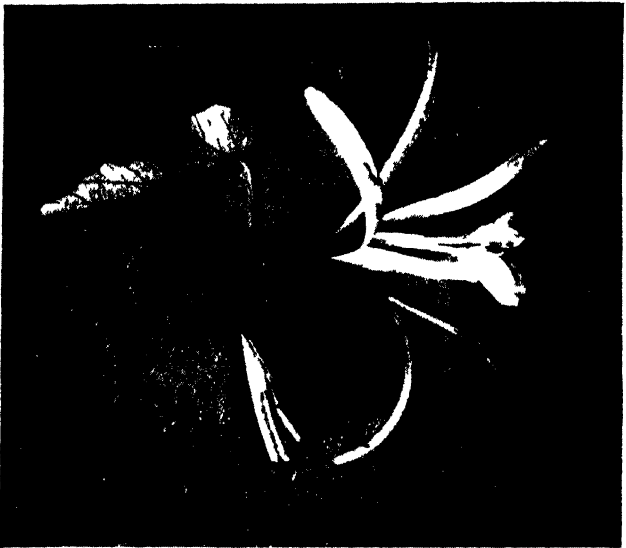
Brownea ariza, coccinea & grandiceps.
(*Page 158.*)



Ficus Roxburghii in fruit.
(*Page 154.*)



Barringtonia acutangula.
(*Page 157.*)



Pterospermum acenifolium.
(*Page 161*)

Where ants are a nuisance on flowers or plants, tie a piece of fly paper so as to prevent the insects climbing up the stem or use a lump of cotton soaked in a weak carbolic solution

Corrosive sublimate of mercury $1/8$ oz. to half a pint of sugar syrup is recommended as an ant poison while one ounce of turmeric powdered and dug into the soil will keep 100 sq. feet clear of ants for a few days.

Flit and the many similar spraying liquids on the market are very good to kill or drive away ants but are liable to damage plants.

White ants. Termites are difficult to get rid of, permanently at any rate; to drive them away temporarily use boiled neem leaf and bark; a weak solution of Sulphate of copper may be tried but is dangerous to plant life so use 1 oz. to 2 gallons of water.

White Ants on the bark of trees seldom damage a plant, as they eat dead material and can be kept away by scraping off the runs frequently, or wiping the trunk with a kerosened rag. If very troublesome apply a wash of the following ingredients, 2 parts castor oil or neem cake, 2 parts bazar aloes, 2 parts assafoetida, and 2 parts dikamali gum. Pound and rot the oil cake and mix in the rest with sufficient water to make a thin paste. Sweep the trunk clean and apply a band of 12 inches wide about 2 feet from the root.

Where white ants attack dead timber some anti white ant paint, creosote, or tar should be used. An ounce of Sodium arsenite in one gallon water with a wineglass of Kerosene, also proves quite efficacious.

If the nest of white ants is discovered use carbon-bisulphide or Cyanogas, but several kinds of white ants are difficult to trace back to their nests.

Where the soil is heavily infested, dig frequently and fumigate with Cyanogas crystals or Calcium cyanide and cover the treated part with a tarpaulin for a couple of hours.

Mildew. Dust on "flowers of sulphur" early in the morning while the foliage is still wet with dew, cut off the badly effected foliage and burn. Or use a solution of Sulphide of potassium 1 oz. to 3 gallons of water or 1 oz. Bicarbonate of soda to 1 gallon of water.

Fairy rings on lawn.—This is due to a fungus, fork up the destroyed grass a few inches beyond the circle and dust on sulphur, damping the soil before application.

Plants most commonly affected by fungus are the Violet and Chrysanthemum, Roses and the annuals, Larkspur and Dianthus. The white mycelium is not always present except in the advanced stages of the complaint, but it is always safest to treat for suspected fungus. Sterilising soil is done by hot water, fire heat or formalin but, besides being tedious, is not successful unless very carefully carried out. Affected soil should either be buried deep or grassed over. Fungus causes gumming in fruit trees and is encouraged by a too rich soil, use the sulphur treatment,

Leaf-eurl on Peach, Plum, etc. only yields to Bordeaux mixture applied on several occasions, after fruit is gathered and again when new leaves are half grown.

“Damping off” disease in Tomatoes, etc. is due to a fungus, when not caused by over watering or dampness.

Permanganate of potash solution is made by adding 1 oz. of the crystals to 2 gallons of water, mixing in 2 ozs. of soap to make it more efficacious. This can also be used for fungus.

Caterpillars—Remember that there is no insecticide that will destroy insect eggs, only the young as they hatch can be combated. There are so many types of these leaf eating or stem boring creatures that they must fall under one head. Eventually all turn into butterflies or moths, the chrysalis forms either in a sheltered spot, hidden by a cocoon of silky or shell like material, or else below ground. Sprays, if they can be frequently given, will kill or shift the pest when in caterpillar form but hand picking is certain to remove them. Katakilla, a tobacco or kerosene solution should be used. If a plant wilts it is either the work of a cockchafer grub underground or a boring caterpillar.

Leaf miners and *leaf rollers* are caterpillars for whom a kerosene spray is recommended but often the spray does not penetrate their chambers and it is only on the leaf which these creatures eat that the poison can be deposited to be of any use.

The yellow wasp is very fond of caterpillars, but which is the lesser evil ?

Borers in the stems of plants. These are not usually discovered till a little pile of excavated material falls below the stem. A wire run up the hole is a certain method of killing the intruder. Use a fountain pen filler with a saturated solution of salt or kerosene and syringe this in ; carbon bisulphide too can be used the same way. Afterwards plug the hole with cement or tar.

Shot hole borers are those that destroy root and stem, and can only be got rid of by cutting off the branch and destroying it. Where the branch is very large, harpoon with a wire and plug the hole.

Thrips, Aphis, (Greenfly) etc., are advertised by mottled or distorted foliage, sticky exudations, etc., spray with Quassia, Katakilla, Tobacco water, etc. Aphis on field crops such as Cabbage, Turnip, or on Chrysanthemum, etc, are very destructive. Use a weak Kerosene solution or Tobacco water. Manure to give strength should also be applied, and Nitrate of soda is best for this as it will start arrested growth again.

Woolly Aphis or *Mealy Bug*, a white fluff covered insect on foliage plants, can be removed with a Kerosene emulsion or the mealy bug touched with Spirits of wine.

Red Spider is a minute mite, rusty red in colour, which attacks certain plants causing the foliage to become mottled and fall. A Tobacco soap wash, Quassia, Kerosene emulsion, or flowers of Sulphur dusted on, are some of the remedies recommended. The addition of sulphur to any of the above sprays makes them doubly certain.

Wood louse in orchid pots and other insects as well, can be drowned out by dipping the pot into water. One ounce of Scrubb's Cloudy ammonia in two gallons of water, is also a safe solution with which to water affected plants.

Snails and *slugs* are very prevalent at certain seasons of the year in gardens, and eat down the tender foliage of Fittonia, Begonia, etc., in the fernery and glass house. Hand picking is nearly always resorted to. When the pest becomes too numerous, dust the spots with fresh lime every night or syringe the leaves with a Tobacco soap spray, especially on the under surface.

Beetles and *Bugs* are not affected by any except a food poison. It is a good plan to use a light trap when *beetles* commence worrying.

A kerosene lantern, acetylene gas lamp or any light, placed in the centre of a bowl of water on which a little castor oil has been poured to prevent the insects climbing out once they fall in, is recommended.

Pumpkin and Potatoe beetles. A small orange creature, similar to the one attacking Asters, can be picked by hand or caught in a butterfly net and this can be managed if you get the mali to work before the sun rises. Dust with 1/4 lb. powdered tobacco to 4 lbs. wood ashes, or 1/4 oz. of Paris green to 1 lb. slaked lime, first wetting the foliage. Or spray with Katakilla, etc., during the dry season.

Palm beetles should be harpooned and the cavity they make plugged with dry sand or better still with sand moistened with a dilute carbolic solution.

Scale insects and froghoppers. The former are often found on indoor ferns and palms and cause a lot of damage to the foliage. Syringe with Kerosene emulsion or Quassia, first removing as many of the insects as possible with a brush. Keep the plants segregated and give them out door treatment while affected. Froghoppers are not destructive but spoil the appearance of the plant with the spittle like mass of froth around them. Any spray will shift them, or they can be removed by hand.

Weevils in seed. Napthalene is safest for this purpose but if a teaspoonful of carbon-bisulphide is poured into a quart bottle of seed and sealed up, the creatures will be destroyed.

Other Pests. Though the next few paras do not refer to "insect" or fungus they apply to real pests which the amateur so often meets with.

Seedlings of Peepul or Banyan trees. When small these can be dug out of the wall but larger plants will have to be killed.

Bore several holes into the main stem in a downward direction near the base of the tree, at least 2 to 3 inches in diameter, fill these half full of quicksilver, kerosene, arsenic, weed killer or such poison. Plug the mouth for a fortnight and repeat the dose. Commence treatment at the end of the winter but before the sap rises. In some cases the removal of a ring of bark two feet in width right round the tree, kills it. If you cut down the tree to a stump, paint the

Goats and Cattle eating bark ; a paste of clay and cow dung should be made with water to which add one ounce each of fish soap and Quassia chips to every gallon of water. Sulphate of copper (toothia) can be used too at the rate of one ounce per gallon of water in place of Quassia.

Insects in library Books. Fish insects, Cockroaches, etc., soon destroy the covers or riddle the binding. Try the following :—

Corrosive sublimate	...	1 oz.
Carbolic acid	...	1 oz.
Methylated spirits	...	2 pints.

Paint the covers both inside and out with the above and air the books for an hour before re-arranging.

Sparrows, Bullbuls, etc., in their places are welcome, when they become destructive use bird lime on the twigs where these birds rest at night.

For birds destroying Sweet Pea buds, Duranta berries, etc., spray the berries, etc., with the following : 1 oz. soft soap, 2 ozs. Quassia to 1½ gallons of water. Steep the Quassia chips for 24 hours in cold water and strain off, keeping the chips for future use, dissolve soap in hot water, mix in the Quassia extract and make up the quantity with cold water.

Rats are not easily enticed to poison. Try the following recipes which are however dangerous to Poultry, etc.

1. Barium carbonate (Commercial) ... 4 ozs.
 Oil of aniseed ... 5 drops.
 Suttoo (ground gram) ... 4 ozs.
 Mix into balls with lard or dripping.

2. Zelio wheat and Zelio paste are very efficacious for mice and rats.

3. Equal parts of plaster of paris and fine oatmeal flour, flavoured with cheese or aniseed. Place a saucer of water alongside the dry powder.

Simple Recipes. *Tobacco water.* Boil 1 lb. of country tobacco, leaves and stems, in a gallon of water, when strained it should be the colour of strong tea. In this dissolve 1/4 lb. of hazar snan

and to every gallon add a wine glassful of Kerosene. Use this mixture in the proportion of 1 : 4.

The water used with insecticides should always be soft, add a little soda if this is not possible.

Kerosene Emulsion. Soft soap 1 quart, kerosene one pint, knead till the soap has absorbed the oil, then add 2 gallons hot water. Churn or pump the mixture through a garden syringe for 15 to 20 minutes, dilute 1 part to 10 of water for scale insects, etc., 1 to 20 for caterpillars. Kerosene Emulsion can also be prepared by using 8 ozs. bazar soap to 1 pint of kerosene, adding an ounce of naphthalene to keep the mixture more stable, and 2 gallons water. By using 1/2 seer of flour (vernacular, *ata*) with kerosene, the emulsion is easily prepared.

Quassia Extract. Boil 8 ozs. of Quassia chips in 4 gallons of water for ½ hour, strain off the liquor, add 8 ozs. of soft soap to this and mix thoroughly. Make up to 10 gallons with water. For red spider, add half a pound of flowers of Sulphur.

Bordeaux Mixture for an orchard or use on a large scale is made as follows : For every 12 gallons of water, take 1 pound of unslaked lime and 1 pound of bluestone (Sulphate of copper, vern, toothia). Dissolve each in a wooden tub, separately, in 1 gallon of hot water and when cool mix together adding 10 gallons of water. Spray on to the plants.

Or use this spray. Dissolve 1 ounce of Copper carbonate in 8 ounces of liquid ammonia and add to 10 gallons of water.

CHAPTER SIX.

WEEDS.

What a subject to write about, yet half the mali's work in a garden is battling with these plagues. But what constitutes a weed? A definition is hard to arrive at for some weeds are beautiful when kept within bounds, for instance the Ageratum and Water Hyacinth, while others are a curse anyhow.

The principle of gardening really amounts to this, the growing of the weeds of some other part of the globe in an environment which does not suit them.

The moment a plant "finds its feet" and goes "must", like an elephant, it becomes a weed.

There are numbers of weeds to be found in a garden but nothing will be gained by giving botanical or even vernacular names, when they possess even this. Weeds are undesirable and must be eradicated. Din this into the ears of your mali and see that he remembers it.

Never let a weed reach the flowering stage; the period between the production of bloom and maturing of seed is so short that a new generation of trouble is sown almost in a night.

When and how to destroy weeds. Anytime and all the time. During the hot dry months the operation is much simpler, of course, for scraping with the Kodali will bring away the surface rooting types and the sun's rays do the rest. In wet weather some deep rooting kinds can be easily pulled out by hand, others have to be dug out with that instrument of torture, the nironee. A good few, thank goodness, need only to be cut below ground level and possess no tuberous root to necessitate deep digging.

What to apply. An arsenic poison or any substance that is death to a weed is certain death to the cultivated plant, so when using a weed killer on a road do not let the spray from the watering can fall beyond the brick edging. And wash the watering can very thoroughly before you water plants.

Weeds on Lawns. Motha is one of the chief troubles on a lawn, it is very vigorous during the wet weather but if weeded at frequent

intervals can be over-powered by doob grass during the cold season. Having a bulblet, or rather several linked up, it is difficult to totally eradicate. Ulu grass sends up straight spiky leaves and must be dug out, this is quite easily done as the colony does not spread rapidly and roots remain within a foot of the surface.

Rarhi or Kasia on the other hand has long sharp edged foliage and a very deep rooting stem, an inch piece of root untouched with start infection again, so you must dig deeply and constantly. *Andropogon halepensis* is another grass hard to eradicate.

A number of grasses form cushions of foliage and are easily removed by being cut at ground level. A very good way of clearing a heavily infested plot of grass is, during the hot weather, to get grass cutters with their jhabows, (scythes) to have the grass absolutely shaved. The Kodali in the hands of a careful cooly can scrape (cheal) the surface as closely. Sweep away all the loose material and after a couple of weeks weed thoroughly. Portions of the close clinging *Dentella*, *Evolvulus*, etc., which have escaped destruction will grow up and can be removed.

Doob grass can be dibbled in as the wet weather comes in.

Water Weeds. Pond Weed on the surface can be killed by syringing on to the surface of the tank, a solution of Sulphate of copper 1 oz. to 50 gallons of water.

It is advisable first to remove as much of the weed as possible by running a straw rope over the surface and then use the Sulphate.

Water Hyacinth is large enough to collect with the straw rope, dry and burn it. Poison has no effect on the Blue Devil.

Hand labour may reduce deep rooting water weeds when the water in the tank is low, but total eradication is only secured if the tank is dug and the sides scraped.

Weeds on roads and paths. The Khurpi and Kodali soon ends the life of surface rooting weeds especially if tackled in the dry weather. Poison is only necessary where the roads have been neglected for years and the quantity of weeds make it impossible to do the work thoroughly or labour is difficult to obtain. Motha grass, which has a bulblet to fall back on, can be decapitated times without number and will still throw up a shoot unless the bulblets are also killed.

The flame of a blow lamp, boiling water and even an arsenic spray does not affect this grass and the only certain remedy is digging it out.

For the amateur with a small garden it is hardly worth making up a weed killer though Recipes are suggested. There are several safe preparations on the market and full directions are given with them for application.

Weeds in beds, etc. Continually dig fallow ground for the *Amaranthus*, *Ageratum*, *Nicotiana*, etc., will bear seed even when they are a couple of inches high. If discovered when in fruit cut carefully and either burn, bury deep or throw the plant into the dustbin, never let it go into your leafmould pit.

Some of the *Ipomea* (*Convolvulus*) and *Vitis* family send out underground runners which will have to be dug out, do this thoroughly.

The Railway creeper, used so largely for screen work, ruins annuals if by any chance the roots reach the bed. Either build a semi-circular dwarf wall 18" below the surface or bury a half moon of corrugated iron to restrain the roots from spreading beyond a certain area.

Clerodendron infortunatum is a deep rooting shrub which must also be dug out.

Certain kinds of weeds love shade, such as the *Oxalis*, an everlasting (*Guaphalium*) and one of the *Peperomia* for instance, others glory in the sun particularly the *Portulaca*. In all cases, destroy them before the seeds form.

Recipes. Proprietary weed killers cannot always be obtained so a few simple remedies are given. Both arsenic and corrosive sublimate are deadly poisons; personally supervise their preparation and application.

Weed eradicators should only be used on paths and never tried on land which might come under cultivation as arsenic lies in the soil for a long period and is fatal to plants.

(1) One oz. Corrosive sublimate of mercury (bichloride) to 30 gallons of water. Sufficient for 100 square yards.

(2) Washing soda 2 lbs. and White arsenic 1 lb. Dissolve soda in 2 gallons of boiling water in an earthen vessel, add the arsenic and boil for ten minutes, make up to 8 gallons of water. which will do 100 square yards.

(3) One lb. Sulphur and 1 lb. unslaked Lime in 2 gallons of water, mix sulphur and lime together dry and slake, this will be sufficient for 25 square yar's.

(4) One pint Creosote or 1 oz. Carbolic acid to 2 gallons of hot water is sufficient for 25 square yards. A second application is often necessary.

It is safest on the whole however to purchase a ready made Weed Killer in powder form and follow the directions given for its use.

Blanket Weed. Work out the cubical contents of the pond calculating $2\frac{1}{2}$ ozs Sulphate of copper to every 10,000 gallons of water, place this in a bag and drag it backwards and forwards over the surface of the water till it is dissolved. To obtain the cubical contents of a tank multiply length by width and then by depth. As a cubic foot contains $6\frac{1}{4}$ gallons of water multiply the number of cubic feet by $6\frac{1}{4}$ and deduct 5% for the area lost by the sloping sides.

CHAPTER SEVEN.

SPORTS & HYBRIDS.

A short note on the methods whereby new plants come into being may be interesting to amateurs, many of whom consider the making of new varieties as little short of miraculous.

Believe me, there is nothing difficult at all about the operation of cross-breeding but a little care and patience, apparently qualities not possessed by every one, are essential. No result can be expected in the first generation and this disgusts most experimenters.

Sports. There is no explaining why a sport takes place. By this word one refers to the spontaneous change from normal that is often seen on a Croton bush, for instance. A small branch loses the red pigment and sends out green and yellow leaves instead of bronze and red. If this new branch is carefully separated from the parent plant a new variety will be the result. Flower changes also take place in this way and where only red flowers were expected one blossom a paler shade, or edged with white, is produced. The careful gardener marks the sporting flower, collects and sows seed and awaits the result with interest. If lucky, a change in the seedlings might give a different shade of colour and this first break in the plant can be followed up by cross breeding. Green leaves often become variegated, foliage alters in dimension, height variations take place, colour and shade changes occur, in fact there is hardly any limit to the variety that sporting may produce. And if plants are propagated vegetatively, by layer, gootie, graft or cutting, these changes can be reproduced and in most instances will remain constant.

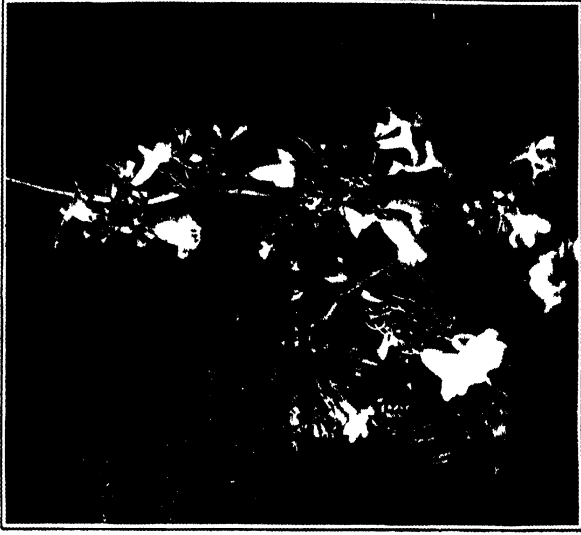
Hybrids. Cross breeding however is not all luck. A careful breeder will think out his cross and with that end in view, work up the hybrid. To obtain a break in the rhythm of plant life is the first stage, then selection often follows and an improved strain is thus obtained.

The flower must be first of all emasculated, *i.e.*, the male organs removed, and "bagged". The pollen from another flower selected as the male parent must be applied at the correct moment when the

stigmatic surface is most receptive ; the flower is again "bagged" to avoid infection by other pollen, till the seed sets. Each flower has its own peculiarities of fertilisation, some stigmas are receptive late in the evening and by morning are "dead" to any pollen. Should you desire to study the subject thoroughly obtain a copy of "How to Hybridise" from the Agri-Horticultural Society which tells in simple language exactly how to proceed. The writer's results are "proof of the pudding" and though every attempt was not crowned with success he is able to show a very large list of successful crosses to his credit.

When experiments are conducted on a large scale quicker results are naturally obtained, than when one is growing only a couple of seedlings. Hybridising is a fascinating study and not as marvellous as it first appears, but certain laws must be followed and the cross made within family limits. To attempt to obtain a blue rose by crossing a rose with a corn flower is to ride for a fall.

Hybridising is slow and uncertain for often in the first generation the resultant plant is a throw back. Do not be disappointed. A further cross may unite the characteristics you so much desire.



Jacaranda mimosifolia.
(*Page 160*)



Bauhinia variegata (variabilis)
(*Page 157*)



Melia azedarach.
(*Page 155*)



Thevetia nerifolia varieties.
(*Page 162*)

CHAPTER EIGHT.

THE ANNUAL FLOWER GARDEN.

This is a particularly long chapter, you will notice, in spite of attempts to curtail it where possible.

Seeds of Imported varieties. Do not obtain your requirements much before the season of planting, seedsmen have proper arrangements for keeping the packets air tight. And a word of advice—pick on a reliable seedsman and not a cheap jack. On receipt of the packets place them in an air tight bottle or tin. Watch the chart for the sowing season and do not attempt a much earlier period than recommended, these experiments have all been tried by others who have paid for the knowledge that is now at your disposal.

The amateur is often misled by specimen annuals represented in a seed catalogue. These merely show an ideal plant, picked out from thousands of others, and is there to advertise.

Each seedsman has his own strain bearing perhaps a different name from the identical variety offered by his neighbour. Improvements and new introductions take place every few years and the old types are surpassed by superior strains, with larger flowers and better colours. To keep abreast of these variations, obtain a new seed Catalogue every year from which to make your selection.

Seed Collection, how, when and what to collect. Though a large number of annuals bear seed in our gardens, the actual varieties that are worth acclimatising are few as the crude colours are invariably in majority; single types take the place of doubles and unless careful selection is resorted to, results after 3 years are very poor indeed.

There are quite a few varieties of both the Winter, Summer and Monsoon types which can be grown from acclimatised seed but it is best to leave the selection to a reliable seedsman who will know what to offer.

However, if you wish to try your hand at seed collecting pick the following:—Cosmos, Cornflower, Hollyhock, Sweet Sultan, Tithonia, Larkspur, Sunflower and Nasturtium.

Collect the seed when it is ripe and pods just bursting ; each variety matures differently, Aretotis fluffs up and gets blown away, Phlox and Balsam split and scatter their seed and so on. Gather the pods just before this happens.

Dry the seed in the shade for at least a week, clean thoroughly and then pack away in air tight receptacles, preferably glass, and store in a dark dry cupboard till wanted. Pick on the clearest colours and take seed from the pods that bore the first and largest flowers.

Site and lay out. It does not always lie with us to arrange for the ideal aspect. Annual flowers want the full days sunshine to bring them to perfection, if slight shade falls on the beds from the West the growth does not suffer much.

Annuals never do well under trees, the drip from above and the roots below have a detrimental effect on these short lived plants and it is best not to attempt growing them immediately below trees.

The lay out of the beds adds to the beauty of the annuals. Where a Persian Carpet design is made use of and the various annuals bedded for a mass effect only, a ribbon of grass 12" wide can be kept, otherwise beds should be separated from each other by at least 4 feet of grass. This allows the lawn mower to be used freely.

Choose a simple design, the more intricate the beds are the easier it is for them to get out of shape.

Soil. One can make up the right soil for annuals in time. Where the earth is very clayey the addition of lime will help to break up the stiff soil and sand will make it more porous. Humus such as stable manure, leafmould, etc., as well as constant cultivation, makes a workable soil out of a paddy field in a couple of years. But where the soil is sandy add clay for one cannot entirely depend on organic manures to improve the texture of the soil. Cow Manure and leafmould will give the required substance and frequent doses of liquid manure keep the plants in growth. But see Chapter Two.

Preparation of Beds. Dig your beds thoroughly, at least a foot to eighteen inches deep, as soon as the rains are over and the soil is dry. Beat out the clods of earth and dig again allowing the air to penetrate to the lowest point of digging. This not only dries the soil but allows any bad gas to escape and helps to mix the manured

top spit of soil with the worn-out earth that has settled below. Before making up the bed finally fork in leafmould or well rotted cow manure say, a basket of half a maund weight to a bed six feet by three feet but this depends on the tilth of soil and previous attention.

When to sow.

On the Plains. Hot Weather. Sow in December-January.

Rainy Weather. Sow in April-May.

Early Cold Weather. Sow in July-August. These periods are approximate only.

General winter or cold weather type. Sowings should be made as soon as the Monsoons end, i.e., early September till the middle of October, but elevation and rainfall must determine the exact period. Quick flowering varieties can be sown in November and December.

On the Hills. Half hardy and tender annuals are sown in Spring. In this class we find Aster, Portulaca, etc.

Hardy Annuals either in Spring or Autumn if protection can be given during Winter.

Note. Do not accept the instructions given on the packet of seed as directly applying to your district and to be literally followed. Judge seasons and climatic conditions.

How to sow Seed. First damp the soil as recommended in Chapter Three, sow thinly so that when the seed germinates each individual seedling can be removed without damaging a number alongside. Cover the seed with its own depth of finely screened leafmould.

Sow only half a packet of seed, allow a week or ten days to elapse before the second-half is sown; this will give you a succession of plants and, should the first sowing be destroyed by rain, you have still some to fall back on.

Seed of delicate annuals such as Petunia, Primula, etc. should be sown under glass or the pan covered with a pane of glass, only early morning sun being given till germination takes place. Keep seed beds open all night except in wet weather.

Hardening off seedlings. As soon as these are above ground the amount of sunshine should be increased till the seedlings, when about an inch in height, will be sufficiently strong to bear the full days sun.

Germination of seed. Amateurs are apt to get worried when seed does not germinate immediately.

Zinnia, Cosmos and most of the Compositeae show up in 48 hours, Dianthus, Carnation, Candytuft in 4-6 days, Phlox, Verbena, Pansy and other hard seeded kinds in 10 days but sometimes a dry spell or some climatic variation, to which the seed is apparently susceptible, will delay germination for weeks. Phlox and Larkspur have come up 6 weeks after sowing.

In cases where seed are long delayed in coming up, transplant some quick growing seedlings, Alyssum or Dianthus, into the pan without disturbing the earth too much. The ramifying roots often have the desired effect. Never toss out the pan because the seed has failed to germinate, use it again for seedlings or sowing another variety of seed.

Remember that in a strain of double seed, the weakest plants usually give the most double flowers; for this reason retain all seedlings that germinate.

Transplanting into the ground. When transplanting the seedling, whether from a pot or the ground, dig a hole say three inches in diameter and fill it with leafmould and soil in equal proportions and into this bed the new seedling.

Be careful how deep you bury the stem; with the exception of Balsams and a few that root at the collar of the plant, all others should be planted with the surface roots just covered by earth.

Transplant when the second and third pair of leaves have formed, being careful not to break the tap root. Phlox can be planted shortly after the first pair of leaves form.

While it is usual to transfer seedlings in their small state it should be clearly understood that, with care, quite large plants have been moved without in any way delaying the flowering period. When these plants are lifted, they must have a large ball of earth round their roots and the hole into which they go should be filled with water,

so that the delicate roots can commence drawing up moisture immediately they recover. Shade the plants for at least two days.

Balsam and Ageratum are two of the annuals that require constant transplanting to keep them dwarf. For other seedlings the fewer the shifts, the better will the plants grow.

Transplanting into pots. Pot off seedlings into clean pots with clean crocks at the bottom and use as a potting compost one-third leafmould and two-thirds garden soil for the first transplanting; for the permanent shift one quarter each of cow manure, and leafmould to half of garden soil should be used. Do not damage the roots of seedlings when transplanting; also see that the tap root does not get bent or broken when shifting from one pot to another.

After transplanting keep shaded for a couple of days then gradually harden off but never transfer pot plants to the open ground till thoroughly established. It is a good plan to use 4" pots first and then transfer to 8" or 10" pots.

Seedlings from the ground should be lifted with a generous ball of earth which should be somewhat reduced before it goes into the pot.

Damping off. If seeds are sown too closely the crowded seedlings are liable to get attacked by a fungus which causes the plants to damp off. Transplant immediately the disease is noticed but if the seedlings are too small and the damping becomes severe, use a weak solution of formalin or Formaldehyde (40% strength) 1 in 50, or Sulphate of copper 1 part to 100 parts water by weight, or a pale pink solution of Permanganate of potash. One application every second day should cure the complaint in a week. Don't let the earth get dry and caked as this will often cause seedlings to fall over and die and be mistaken for damping off disease. Fork it up with a fine splint of wood or wire and if the seeds are delayed in germinating soak the pan in water by gradually lowering it into a tub and allowing the moisture to penetrate from the bottom upwards.

Watering. The common mistake of a daily watering whether a plant requires moisture or not, causes more damage than anything else. No hard and fast rule can be laid down. The amateur should soon judge by results whether the mali understands the principles

of gardening or not. Water must moisten all the soil in the seed pan, not merely the surface half inch. If after the operation water continues to lie unabsorbed in the pan, fork up the soil or make half a dozen holes around the rim and allow the water to penetrate. Test the dryness of the soil occasionally by digging down an inch. Water should be applied with a fine rose and allowed to fall on the seedling lightly, the mali often directs the full force of the water in a downward direction with disastrous results. A Haws patent rose is the best to use for seed operations. You must also warn the mali not to increase the size of the holes by driving a nail in, to open the openings blocked with manure, etc.! Water before the sun rises and it becomes too warm, or late in the evening. The numbers of times you require to moisten the seed-pan depends entirely on weather conditions, once a day during the winter months or, when the weather is cloudy, once in two days. In the hot weather twice a day if very dry.

After care. Once the seedling is in the ground do not imagine your troubles are at an end.

Stake all plants as soon as they get six to eight inches high, for if blown over the plant gets a shock and may be damaged when being propped up again. Discourage precocious flowering; Aster, Cosmos, Larkspur, etc., often show a bud when an inch or two high, pinch these off. Remove dead flowers for seed formation weakens the plant. Disbud if you want larger blooms and stronger plants.

Manuring. In manuring never use half rotted manure, but clear liquid Cow manure. Soot will deepen the colour of foliage, and Nitrate of soda or Sulphate of ammonia bring along backward plants but only homeopathic doses must be given. Too much will cause the plant to run to leaf. Lime in the shape of crushed limestone is beneficial for some annuals, and where continuous doses of manure have been given for some time, lime will prove effective. No manure is recommended till the seedlings have started growth, for then none is wasted but immediately assimilated by the roots.

Liquid manure should be given when the buds show, Ichthemic Guano or Cow manure are most used. For further information refer to Chapter Two.

Time of flowering. How long do annuals take to bloom? *Salvia* might flower in 6 weeks, yet can be delayed to 3 months and in like manner, by pinching back or feeding and forcing, the season for flowering can be delayed or hastened. The average time it takes for a flower to open from seed sowing is given in the detailed notes elsewhere.

Insect Pests and Diseases.—Caterpillars are seldom numerous enough to worry about when plants are mature, for the loss of a few leaves makes little difference. In their small state seedlings can be eaten down past the growing tip and killed.

Antirrhinum, *Dianthus* and occasionally *Nasturtium* lose their foliage and sometimes a caterpillar will enter the buds of a *Carnation* or *Dianthus* and eat out the petals leaving an empty calyx to cheat you.

Beetles on the *Aster* and *Clarkia* are a nuisance and difficult to catch. The orange coloured variety is partial to *Aster* and the blue black beetle descends on the *Clarkia* sometimes in such large numbers as to eat down the plant to bare stalk in a couple of hours.

Leaf curl caused by aphid is common on *Clarkia* and *Zinnia*, *Ipomea rubro coerulea* too is affected. A tiny flea beetle attacks the flowers of *Stocks* and *Wallflowers*.

If a tip droops look out for a beetle which punctures the stem. Fungus takes toll of *Larkspur* and *Dianthus* in particular but very seldom is this disease reported in an epidemic form.

Red ants ring *Dahlia* and *Sunflower* at ground level but can easily be driven away with a Carbolic disinfectant, a more serious pest of the *Dahlia* is *Dorylus laevigatus* which destroys the tubers.

White ants are brought into the garden by the use of half rotted cow manure or wood and leaves in the leaf mould while the grubs of the *Cockchafer* beetle owe their presence to cow manure.

Birds are a nuisance, from the sparrow and dove which eat seed to the mischievous bulbul on the *Sweet Peas* and the parrot on *Tithonia*, *Dahlia* and *Sunflower*.

Rats sometimes eat seed but are more of a nuisance when they tunnel and destroy plants thereby. Grass hoppers and crickets can be counted as minor pests.

Anchusa.—H. 12'-18"—D. 12"—F. 3 months. Blue flowers, like Forget-me-not. Excellent for the mixed border or pot work.

Ageratum. H. 3'-6" D. 9"-12". F. 2 months. Used for edging, will remain dwarf if transplanted several times and pruned. Blue shades the best. Remove flowers as they fade; for the mixed border.

Alyssum (Sweet Alison). H. 3'-9" D. 6" F. 6 weeks. Sow in pots and transplant or broadcast and thin out. Used for edging beds. Soil light with a small quantity of old lime. A low growing, spreading annual with white sweet scented Candytuft like flowers. Sow in succession from October-January.

***Amaranthus tricolor splendens.** (Joseph's Coat) H. 2'-4' D. 12'-18" F. 6-8 weeks. Handsome foliage plants green or bronzy green barred yellow and red, for pot or ground cultivation. Sow in pots and transplant when an inch high. Grow on a raised bed, soil not too rich, liable to damp off in wet weather. During the cold season the annual grows only 12" high.

Antirrhinum—(Snapdragon). H. 6"-48". D. 9"-12" F. 3-4 months. Colours white, yellow, pink, orange and red shades soil light, rich, dust on lime. Pot or ground. Three to a 10" pot. Useful for cut flowers. Types dwarf (6"-9"), intermediate (18"-21"), and tall (36"-48"); intermediate the best.

***Arctotis.** (Blue-eyed or Transvaal Daisy) H. 18"-24" D. 12" F. 4 months. Soil light, rich. Flowers dove white, close at night, but re-open next morning, and last three to four days. Good for cutting. Can be grown in the cold season too.

Aster. H. 6"-9" D. 9". F. 4 months. Pot or ground, one in a 8" or 9" pot colours white, blue, mauve and red shades. Many types, choose Comet, Ostrich Plume, Victoria. Soil rich, light, well drained. Flowers last very long. The plants require constant watching as they are often attacked by an orange beetle. Acclimatised Tall Branching type certain to flower. Precocious flowering due to a check the plant may receive through climatic change or careless handling of seedlings.

†**Balsam.** H. 12'-15". D. 6"-12" F. 1-2 months. Pot or ground. Three to a 10" pot, soil light and rich. Transplant seedling three or four times burying the stem a little lower each time.

Colours white, mauve and red shades. Can be flowered on a single stem by the removal of side shoots. Grow the Camellia flowered type.

Begonia semperflorens. H. 9"-12". D. 12". F. 3-4 months. Pot cultivation or ground. Sow July in light soil to which sand or fine lime mortar has been added 3 to 1 proportion. Pot off into small pots or transfer into boxes before the final shift. Grow on in light soil and give good drainage. Colours white and red shades, useful on the plains for shady beds.

Bellis perennis (*Daisy*). H. 9". D. 6"-9". F. 3-4 months. Soil light. Used for bedding or edging, sow in pots and transplant when 2 inches high or when the sixth leaf appears. Colours white and red shades, grow the white flowered forms.

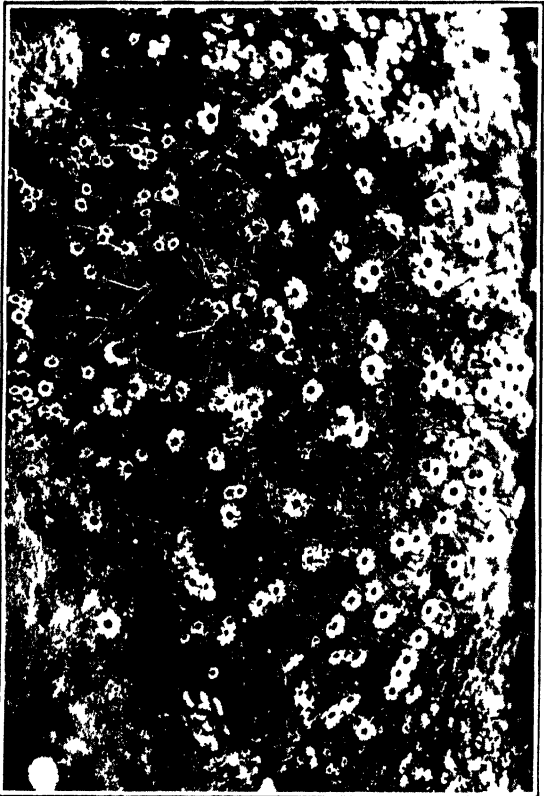
Browallia elata. H. 9"-12". D. 9"-12". F. 3 months. Useful for edging, a good substitute for Lobelia, sow broadcast or in pans, pinch back the tip to bush out plant. Colours blue and white, soil ordinary.

Buck Wheat. (*Fagopyrum tataricum*) H. 18"-24" D. 12" F. 2-3 months. Soil ordinary. This is quite a pretty plant to grow with winter annuals, the tiny white or pale pink flowers are very generously produced in shade or sun.

Candytuft. H. 6"-12". D. 6"-8". F. 3-4 months. Pot or ground. Three to a 10" pot. Soil light, rich. Good for cut flowers. Colours white, carmine, purple. Spiral, Giant Hyacinth or Little Prince best types to grow in white, coloured varieties not very satisfactory as they flower late.

Carnation. H. 8"-12". D. 9". F. 4-5 months. Pot or ground. Colours white, yellow, pink, mauve, striped and red shades. Perennial but some types are grown as annuals. Flowers sweet scented used for cutting, liable to rot at seedling stage. In the plains will not survive the rains, though sometimes layers, taken before the plant dies down, manage to pull through. Grow early flowering Marguerite, Early Malmaison or Vanguard on the plains. No amount of care or manuring can possibly increase the size of flower if from a poor strain.

Carnations are one of the greatest favourites for pot cultivation and though most other annuals can be grown in a general compost special care should be exercised when dealing with the Carnation.



Chrysanthemum annual types
(*Page 65*)



Dahlia seedling.
(*Page 66*)

Centaurea (Cornflower. Blue bottle) H. 18"-24". D. 12"-18". F. 4-5 months, colours white, pink, purple and blue. Soil light. Sow broadcast and thin out. Useful for cut flowers, the blue variety is the prettiest shade.

C. moschata. (Sweet Sultan) H. 2'-3'. D. 12'. F. 2-3 months, colours white, mauve and yellow. Soil light and well manured but must not be overwatered as the plant is liable to rot. Flowers scented, used largely for cutting. Sow in pots and transplant when 2 inches high or broadcast. Sweet Sultan have a delicate root system which is liable to break unless carefully lifted. The yellow is dwarf growing, mauve and white tall.

Chrysanthemum, tricolor, coronaria. (*Marguerite—Annual Chrysanthemum*) colours white, yellow and red. H. 3'-4'. D. 2'. F. 3 months. Soil light. Useful for cut flowers. Can stand a small amount of shade.

Cineraria. H. 12"-18". F. 5-6 months. Grown chiefly in pots. Soil light and rich, colours white, blue, purple and red shades. This annual requires great care and attention and must be raised in shade and flowered in a semi-shady conservatory. Acclimatised seed gives the best results on the plains.

Clarkia elegans H. 2"-3". D. 2'. F. 3 months. A very pretty annual but rather delicate and does not stand much moisture, gets attacked by a black beetle and apt to develop leaf-eurl. Colours white, purple and red shades. Does well in 10" pots. Useful for cut flowers. Soil light and rich. The salmon scarlet shade is the prettiest. Can stand a small amount of shade.

Coleus. H. 12"-18". Perennial. Foliage commences colouring in six weeks. Used chiefly in pots. Soil should be light and well manured, does best in semi-shady situations. Grows from cuttings quite easily.

*‡**Coreopsis (Calliopsis) tinctoria, coronaria,** H. 2'-4'. D. 12"-18". F. 3-4 months; colours yellow and bronze shades. Soil should be light and mixed with lime rubbish, transplant when 6th leaf appears. Useful for cutting, does best in the hot weather, but can be grown all the year round.

‡**Cosmea.** (*Cosmos bipennatifida*) H. 12"-36". D. 12"-18". F. 2 months, colours white, pink, and deep carmine. Lady Lennox type

in October if 10 ft. of vine is only required. In flower November to February.

I. Japanese. In a variety of shades ranging from white to deep crimson. Sown at any time of the year. Makes most growth in the rains. In flower within a couple of months.

Larkspur. H. 12"-36". D. 9"-12". F. 3-4 months. Colours white, blue and red shades. Pot or ground, three to a 10" pot. Soil ordinary. Seed will not germinate till cold nights commence. Good for cut flowers. Acclimatised seed give excellent results. The stock flowered type is recommended.

Leptosyne. H. 18"-24". D. 12". F. 3 months. A light foliaged sun-flower like annual, useful both for bedding and cut flowers. Treatment ordinary but too much moisture is fatal.

Linaria. H. 12"-18". D. 12". F. 3 months. Flowers like small snapdragons, colours white, yellow, mauve and red shades, soil light.

Lobelia. H. 9". D. 9". F. 4-5 months. Colours blue and white. One or two varieties do on the plains but flower very late in the season. Soil should be light and well manured. The basket type is excellent.

Lupin. H. 9"-3'. D. 18". F. 3 months. Colours white, yellow and blue shades. Sow in position as the Lupin does not stand transplanting very well. Soil should be poor and sandy. Use acclimatised seed if possible.

‡**Marigold. French.** H. 12" D. 9"-12'. F. 2 months. Colours orange, lemon. and bronze shades. Soil light, transplant from pots.

‡**Marigold African.** H. 24"-30". D. 12"-18". F. 2-3 months. Colours orange and lemon.

Mignonette. H. 9"-12". D. 12". F. 3-4 months. Pot or ground. One to a 7" pot. Soil light, with a dusting of lime. Sow seed broadcast and thin out. Flowers sweet scented. Colours white, yellow and red shades. Does not bear transplanting well.

Mina lobata. Climber. Grown in pots or ground, in flower within 2 months. Soil ordinary. Flowers yellow and orange. Can

Nasturtium Dwarf. H. 6"-8". D. 9". F. 2 months. Colours yellow, cream and red shades. Sow direct in the ground. Use poor soil otherwise the plants will run to leaf. **Tall varieties** must be planted up a trellis or used in baskets ; they do not climb very well on the plains but usually creep.

***Nicotiana Affinis and Sanderae** (Flowering Tobacco) H. 24"-36". D. 12". F. 3-4 months. Colours white, pink and red shades. Soil light and well manured. Sow in pots and transplant carefully when 6th leaf has formed. Flowers scented, open late in the evening, useful for night decoration.

Nemesia. H. 6"-9". D. 9". F. 3-4 months. Soil light and rich. Colours white, orange, blue and red shades. Does not succeed very well on the plains and dies at the approach of the hot weather. Acclimatised seed gives better results than an imported strain on the plains.

Pansy. (Heart's Ease) H. 9". D. 6"-9". F. 4-5 months. Colours white, yellow, blue, red and purple shades. Pot or ground, three to a 10" shallow pan. Soil rich, with a small quantity of lime worked in. Pansy will grow in slight shade.

***Petunia.** H. 9"-12". D. 12"-18". F. 5-6 months. Colours white, mauve and red shades. Pot or ground, one to a 10" pot. Soil light, nor too rich, as this causes heavy leaf growth. Creeping habit. Plants flower best as the hot weather approaches. Can be kept through the rains on the hills. A very effective way of showing Petunias is in bamboo or wicker baskets raised on bamboo tripods. The small flowering type is far more effective and useful for cut flowers.

Phlox Drummondii H. 9"-12". D. 9"-12". F. 4-5 months. Colours white, yellow, violet and red shades. Pot or ground. One to a 7" pot. Soil light and rich. Spreading habit, makes a brilliant show. If planted in baskets, as suggested for Petunia, it is quite effective. Good for cut flowers. Pinch back to produce side shoots quickly.

Poppy Shirley, Carnation H. 2'-3'. D. 12". F. 2-3 months. Colours white, pink, mauve and red shades. Soil light, sow broadcast with sand to ensure even distribution of seed and thin out. Used for cut flowers but must be cut before the bud opens.

Acclimatised seed gives best result. Imported kinds give very few flowers. The Iceland Poppy from acclimatised seed highly recommended. Ants fond of seed.

***Portulaca.** H. 6"-9". D. 6"-9". F. 3-4 months. Colours white, yellow and red shades. Pot or ground. Five to a 10" shallow pan. Soil light, sandy. Sow seed broadcast with sand and transplant carefully, flowers open only in full sun.

Primula malacoides. H. 12". D. pot. F. 3-4 months, is perfectly hardy on the plains. Sow August and grow in semishade. The seed is very fine and has to be carefully sown but the plants are quite hardy. Bears pink flowers in long sprays excellent for shady spots.

Salpiglossis. H. 24"-36". D. 12". F. 4-5 months. Colours flowers white, crimson, yellow, orange, or purple with dark veins. Pot or ground. Three to a 10" pot. Soil light, rich, slightly sandy. Flowering commences as the hot weather advances. In bedding effect apt to flower irregularly.

Salvia splendens (Scarlet Sage) H. 18"-21". D. 12". F. 4-5 months. Colour scarlet. Pot or ground, one to a 10" pot. Soil light, rich. Very effective in masses. Perennial grown as an annual.

***Salvia farinacea.** Colour lavender blue. Treat as above,

Schizanthus. H. 12"-18". D. 12"-15". F. 4-5 months. Soil light and well manured, does only on the hills or where the cold season is long. Chiefly grown in pots also for cutflowers. Acclimatised seed sometimes succeeds on the plains.

Stocks. H. 12"-18". D. 12"-13". F. 4-5 months. Does best on the Hills or where the cold weather is long, soil must be poor, plants must not be checked in any way. Plants from acclimatised seed flower on the plains, from imported seed only on rare occasions. These annuals do not like water logged soil. Will grow in semishade.

***†Sunflower.** H. 12"-36". D. 18"-24". F. 2-3 months. Colours yellow and red. Soil ordinary, the Miniature types are useful for cut flowers.

***†Sunflower.** Tall varieties. H. 3'-6'. D. 2'. F. 2-3 months. Colours yellow and red. Soil light. Sow broadcast or transplant. Also grown in the cold weather.

Sweet Pea. H. 6'-9'. D. 3"-4". F. 3-4 months. Chipping of seed not necessary, and even soaking detrimental, often overdone. Sow direct in the ground, water very sparingly till 2" high. Soil well manured but firm, give support when seedlings are 12 inches high. Pinch tips when shoots are 6" high. The Australian and Early flowering type cannot be surpassed. Colours white, orange, blue, maroon, purple and red shades. Prepare the ground at least six months prior to sowing seed by digging a trench 2-3 feet deep and filling it with light well manured soil, preferably stable manure. Superphosphate the best manure for Sweet Pea, if soil is heavy; use sand, old cow manure and leafmould in equal proportions should trench making be delayed till October. Fork into top spit of soil, 1/2 tea-spoonful Sulphate of iron and 2 oz. Bone dust per sq. yard. Liquid manure 2. oz. sulphate of potash. 2 oz. sulphate of ammonia, 1. oz. superphosphate to 8 gallons water, once a week as buds show. Blue, purple and maroon slower to germinate than the pale shades.

Sweet William. H. 12'. D. 9"-12". F. 4-6 months. Colours white and red shades. The true Sweet William succeeds only on the hills but the annual varieties (*barbato-chinensis*) can be grown with the cold season selection. This is treated just like *Dianthus*, soil must have lime.

*††**Tithonia speciosa.** (Red Sunflower) H. 3'-6'. D. 2'-3'. F. 3 months, colour, orange. Soil light, well manured. Sow in pans and transplant. A very handsome annual, flowers used for cutting. Grows very tall in the Monsoons.

†**Torenia.** H. 9"-12". D. 9". F. 1½-2 months. Colours blue, and white. Grown in pot or ground, useful for cut flowers.

Verbena. H. 9"-12". D. 12"-18". F. 3-4 months. Colours white, pink, mauve and red shades. Pot or ground. One in an 8" pot. Soil light, rich, spreading habit. Blooms right into the hot weather if dead flowers are picked off. Does very well in baskets as suggested for *Petunia* and *Phlox*. Can be kept through the rains or sown early for early cold weather flowering.

*†**V. perennis.** White and mauve. Very useful during the hot months, perennial.

*†**Vinca rosea varieties.** H. 12". D. 12"-18". F. 2-3 months. Colours white, pink and mauve. Soil ordinary, sow in pot and

transplant when a couple of inches high. A perennial but can be grown annually, useful for the hot weather and rainy season. The white and white with a red eye are very fine, good for cut flowers.

Wallflower. H. 12"-18". D. 12"-18". F. 4-6 months. Colours yellow and bronze shades. Soil should contain lime and be light, does not succeed very well on the plains as the period of blooming of such early types as do flower is very short.

*†† **Zinnia.** H. 12"-24". D. 12". F. 2½-3 months. Colours white, yellow, purple and red shades. Soil light, rich. To make plants bushy, pinch back first buds. Best results for rainy season cultivation obtained by sowing in early May, early cold weather lot sow in October. Flowers in 6-7 weeks.

*†† **Z. linearis.** H. 9"-12". D. 12" F. 2-3 months. A perennial small flowered variety. Flowers yellow like *Coreopsis*, useful for edging.

CHAPTER NINE.

THE VEGETABLE GARDEN.

The amateur can seldom have a Cabbage Patch in a town garden but his mossy friend should be in a position to provide nearly all that the table requires in the vegetable line.

When to sow. On the Plains the best time for sowing seed is from August-September till the beginning of November, Artichoke, Cabbage, Cauliflower, Celery, Parsley and Tomato should be sown in July-August as some are late maturing and acclimatised Cauliflower will give an early crop if sown in time. Sow Beans and Peas latest of all. On the Hills sowings take place from February to May.

Soil. The compost for sowing seed should be the same as for flowers.

The soil of the vegetable garden should be trenched two feet ; this is quite sufficient for annual crops. Drainage is necessary and water should not lie on the land for any length of time even during the heaviest rains, otherwise the manure will be washed out and the soil become sour. The site should be quite open, free from shade of trees or buildings, allowing plenty of light and air to get to the vegetables. The surrounding jungle must always be kept down so as to prevent insects attacking the seedlings. To judge when watering is necessary must depend on the kind and quality of the soil, certain soils are very retentive of moisture especially those that are composed of clay, others, with a large proportion of sand, dry out quickly.

Rotation of crops in the Vegetable Garden is necessary to preserve the fertility of soil. Except for Peas and Beans do not plant the same variety in a plot for more than a couple of years.

Lime should be used for vegetables being dug in every three years as a general rule especially where heavy manuring is used for certain types.

What to sow. Where winter conditions are short, choose the early varieties. In root types take the globe or short horn in preference to long kinds, in leaf types such as form heart quickly.

The lay out. In the Vegetable Garden there is no difficulty at all. One usually makes use of every square yard of ground, leaving only the necessary paths between the various beds. Arrange the types in such a manner that the taller kinds are to the north of the dwarf varieties.

For climbers arrange strong supports, not merely "after thoughts" in the way of branches lightly buried in the soil.

Germination and maturing. Vegetables take 6 to 18 days to germinate, Carrots, Parsnip and Celery being slowest and Radish and Cauliflower the quickest.

How long do Vegetables take to mature ?

Each variety differs so greatly from the next that to give any figures would be quite impossible, for instance Beet matures in 40 to 70 days, and Cauliflower 4 to 6 months. The average period of maturing is given in the notes.

There are only a very few varieties of imported vegetables which can be acclimatised and prove satisfactory of these Cauliflower, Cress, Lettuce, Onion, Tomato, Mustard, Pumpkin, Peas, and Indian Corn are fair.

But the amateur would be well advised to stick to imported seed except where good acclimatised Cauliflower and Indian Corn is obtainable.

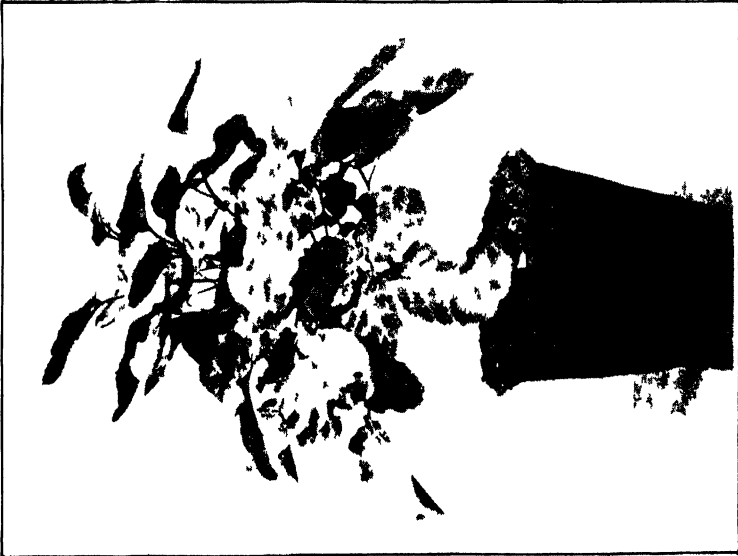
How to sow. To guard against unfavourable weather conditions sow small quantities of seed at intervals of a few days. Cover all vegetable seeds with their own thickness of soil except Beans, Peas and other large seeds which are planted direct in the open, and buried a couple of inches deep.

For details regarding transplanting, etc., refer to Chapter Eight as the treatment of annuals differs little from vegetables in the early stages of life.

If sowing direct in the ground it is advisable to put 3-4 seed in each plot or ridge and when the seedlings are a couple of inches high to weed out all but the strongest. If Gourds are trailed on the ground allow 5-6 feet between each plot but where upright supports can be given 9-12 inches will suffice. Lime the soil for Turnips one week before sowing seed. Use seed beds or boxes for raising seedlings



Acalypha Sandeianii magnifica
(*Pac.* 125.)



Pisonia Balfourii var. *lanceolata*
(*Pac.* 126.)



Hibiscus manihot.
(*Page 67.*)



Dombey a Vallichiana and Lancasterii.
(*Page 130.*)

taking the usual precautions to prevent swamping by rain, etc., Soaked seeds germinate quicker than those direct from the packet but sowing in moist soil and proper watering is quite sufficient.

Exhibition. To prepare vegetables for Exhibition does not mean feeding up to obtain gigantic forms ; coarse specimens are remarkable but not considered by judges in the same class as a medium sized vegetable. Make holes with a dibler 10"-12" deep for long Carrot, Beet, and Parsnips ; for Globe Beet, Short Horn Carrots, etc., 6"-8" will be sufficient. Fill with good light soil and an eighth part of sifted fresh wood ashes, sow 3-4 seeds in the usual way and remove all but one seedling after germination. Nitrate of soda in weak doses should be given when plants are a couple of inches high.

Manuring.—Overfeeding of vegetables causes rot and splitting of Cabbages, Turnips, etc., while root crops become coarse.

Natural manures are safest, and oilcake is the best of these. One can never say what constituent is missing in the soil and unless an analysis is made the wrong chemical manure might easily be added. Weak doses of Sulphate of ammonia and Nitrate of soda produce growth and can be used for most types of vegetables that are grown.

Use as liquid manure 4 parts oilcake, 4 of cowdung, 1 of Superphosphate and 1 of Nitrate of soda in 10 gallons of water. Dilute 1 pint of this stock solution in 2 gallons water and give once a week, to vegetables reserved for exhibition. Nitrate of soda is an ideal manure as it becomes immediately available during the short life of the vegetable. And as it interacts with insoluble potash in the soil Nitrate becomes of greater value to the amateur.

Salt is good for such crops as originated near the sea side, Asparagus, Beet, Cabbage, Carrot, etc., and prevents rankness of growth but should not be applied in larger quantities than 3 oz. per sq. yard. Peas and Beans require little nitrogen once they are started.

Watering. It is always detrimental to overwater any crop but more harm can be done by erring on the dry side. Celery, Leek, and Lettuce become tough, Peas and Beans stringy if underwatered besides, if the plant is given a check, it takes a long time for free growth to recommence.

It is better to flood and allow the moisture to dry out than to continually water with a rose. Fork up the soil, pull up weeds and allow the air to penetrate, then flood. If manure is required give it when the soil is forked up.

The "bolting" of vegetables is often due to a poor strain of seed or too early planting or again to climatic conditions.

When to manure. One should always consider the reason for manuring before applying either liquid or dry manure. If a plant is grown for leaf production do not commence until it is half grown say at least one month after germination of seed.

If cultivated for fruit or seed, early manuring will ten to one throw the strength into the foliage, therefore manure when the flower buds show.

If grown for root or tuber manure just as the root commences to swell.

Transplanting. Certain varieties benefit for being transplanted several times, for instance Cabbage and Cauliflower should never go into their permanent quarters till transplanted twice, Brinjal and Tomato never less than three times. Pumpkin and all the Gourd family are usually germinated in a damp cloth and then planted.

Carrot, Beet, Turnip, Radish, etc. are broadcasted thinly and the extra seedlings removed and if these are carefully lifted and transplanted, good results are also obtained.

Pests. There are several minor pests, birds, mice and squirrels for instance which attack Peas, Tomatoes, etc. ; poisoned bait may be tried for these, but is not always successful. For caterpillars which attack Cauliflowers and Cabbage, wood ashes dusted on and round the plants will be found safe or spray with Katakilla. Poisonous insecticides, though efficacious, are not recommended. Refer to the Chapter Five for further information.

Blindness in Cauliflower may be due to injury to the tip of the root at the growing stage, drought, thick sowing, a sudden check or constitutional defects. Do not blame insects therefore in every instance.

Rats dislike lime and birds too, while as a fungicide its action is

where rot takes place in plants, lime dusted on will kill fungus disease and heal the wound.

For soil infested with slugs among Cabbage, Cauliflower, etc., use 1 oz. Scrubbs' Ammonia to 8 gallons of water.

Leaf scorch in Peas and Beans. Spray with a pink solution of Permanganate of potash, say a pinch of crystals per 2 gallons of water used 3 times a week, give a weaker solution to the roots. After cropping burn the plants.

Pea and Bean seed are often eaten by rats and birds, roll the seed before sowing in red lead and sweet oil.

The mali usually displays a blackened chatty as a scarecrow and to avert the evil eye but neither bird nor beast takes the slightest interest and crops are eaten and destroyed just the same.

Explanatory Note. The first name of the winter vegetables is the common name, that in italics is the vernacular and the Latin name will be found in brackets. The average time it takes vegetables to reach maturity is also given.

Artichoke Globe. *Hatichuk* (*Cynara scolymus*) can be grown up to 4000'. Plant 36"-48" apart. Ready in 5-6 months. Sow on the plains from June-October. On the Hills from February-May. Seeds germinate slowly. Soil should be light, heavily manured and well drained. Transplant when 4th leaf forms, say when 6" high. Water once a week when full grown and give liquid cow manure when bud forms. Perennial on the Hills, grown as an annual on the plains. Can be propagated by division of off-shoots. The flower bud is cooked as a vegetable.

Jerusalem Artichoke. -*Hatichuk* (*Helianthus tuberosus*) grown up to 4000'. Plant 2½' apart, 12" distance between rows. Crop can be dug in 9-10 months. Plant tubers in February-March but place in soil immediately on receipt as they are apt to rot. Soil light and rich, earth up main stem when a foot high and support.

Asparagus. -*Paragras. Merchuba. Sata or Sool moolee* (*Asparagus officinalis*). A perennial. On the Hills sow seed in February-May. Plains, June to September. Sow fresh seed in beds and when one year old transplant carefully to trenches running north and south with slight incline. Depth of trench 12" and about 24" at top, 2'

apart. Roots can be planted in March. Seeds are of slow germination. Cut down in October or with hold water. Work a small quantity of salt into soil before planting roots, and add rich manured soil in small quantities each year. The plants reach maturity in the 6th year but can be cut from after the 3rd year and will last for 15 to 20 years. Bleach with light soil and sand and cut with a sharp knife. Weak doses of salt and soot 2-4 ozs. per square yard dug in during growing season is good as this increases the succulence of the shoots. When new shoots commence to get stringy stop cutting and let the plant run to seed. Dig in old stable manure when plants are dormant, sprouts can be cut from March to August. Manure with Guano, Fish meal, etc.

Beans. *Sem*—Up to 6,000 feet. Ready in 2 to 4 months. Sow direct in the ground 2'-3" deep. On the plains from August to October, Hills, April to June, ready in 3-4 months. Soil heavy, water moderately, but flood in dry weather otherwise pods will become stringy. When plants are 3"-4" high water in $\frac{1}{2}$ oz. of Nitrate of soda per yard row.

Dwarf types. (French or Kidney). 8" apart and 12"-36" between rows. When fruit has set pinch off tip. Give shade for best results especially to French and Broad Beans.

Climbing. (Scarlet Runner or French). Double row 15"-18" apart and each plant 8" from the next, rows separated 4'-5'. Pinch tops to hasten bearing.

Beet. *Chakunder.* (*Beta vulgaris*). Distance apart 6"-9". Ready in 2-3 months. Soil light, sandy. On the plains sow September-October. Hills February-May. Water once a week and give liquid cow manure once a fortnight. Keep soil loose by digging deep, rows running north and south. Sow broadcast or in rows and thin out to 6" apart. A root vegetable used for salad. Globe varieties are the best. Pull when 3" diameter.

Seakale Beet (*Beta chieia*). D. 9"-12". Ready in 2-3 months. The midrib is used as a substitute for Asparagus and the leaf blade as spinach. Sow like Beet.

Brussels Sprouts. *Buttam* or *Cholee Gobi.* (*Brassica oleracea* var *bullata gemmifera*). Sow on the plains August-November. Hills,

rich and heavy. Water once a week when in full growth. Earth up plants slightly, when 9" high and keep soil firm. A long growing season necessary. Transplant after formation of 2nd leaf. Cut large leaves to compel the shoots to form, pinch out head if this is of no avail.

Broccoli. *Chota Phul gobi.* (*Brassica acephala*). Grows on the hills, cultivate like the Cauliflower.

Borecole or Kale. (*Brassica oleracea var acephala*). Sow and treat as Cabbage and transplant 2' apart, ready in February-March. Seldom tried on the plains.

Cabbage. *Bunda Gobi.* (*Brassica oleracea var capitata*). Distance apart 20"-24". Ready in 2-3½ months. Plains sow July-November. Hills, February-May and August-September. Soil rich, well drained. Transplant when 2" high to 3" apart in a seed bed and then again to permanent quarters. Water well, liquid manure should be given once a fortnight when head forms, and half an ounce of salt per plant to increase succulence. Dig in Nitrate of soda a tablespoonful per plant, 9 inches from stem when head has formed.

First sowing in pots during August, followed by a further sowing in September, liable to be attacked by green fly for which use soap and water. Earth up plants when about 9" high. For each plant have a separate hole dug and filled with rich manure. Red Cabbage requires less water than the ordinary kinds but should be treated identically. Early Drumhead, or Pride of India, can be planted 15" apart. After the head is cut if a couple of inches of stem is left, several smaller heads will form. Start seedlings on poor soil to get sturdy plants.

Carrot. *Gajar* (*Daucus carota*). Distance apart 4"-6". Ready in 3½ months. Sow broadcast or in drills 12" apart and thin out. Plains sow September-November. Hills February-May. Soil light, sandy, rich, dig in salt at the rate of an ounce per square yard. As ants carry away a large quantity of seed, a narrow shallow trench of liquid tar round the bed is recommended, naphthalene or turmeric powdered can also be dug in.

Dig soil deep. Thin out plants when they have formed 4 leaves and again when the plants have grown thick, leaving them 6 inches apart at least. Grow intermediate types.

Cauliflower—*Phool Gobi*. (*Brassica oleracea* var *botrytis cauliflora*). Distance apart 24". Ready in 3-4 months. Sow on the plains in July-August under cover. On the Hills, February-April Soil stiff, but rich. Plenty of liquid cow manure when flower first shows, rank feeders. Seedlings delicate. When transplanting place seedling in a small deep hole or trench and gradually earth up. See that the tap root does not turn up in doing so.

Transplant when 4th leaf appears and again when the plants have 8 leaves, into the ground. Start seedlings on poor soil to get sturdy plants, puddle roots in cow manure but reject all knotted stems. When flower head shows shade with leaves of the plant itself to keep curd white. Grow Snowball and acclimatised types for certain results.

Celery—*Karias*—*Shalari*. (*Apium graveolens*). Distance apart 12'-15". Ready in 5-7 months. Sow on the plains June-July. Hills, February-April. Seed slow to germinate. Sow in pots, transplant into trenches running north and south. Soil light, heavily manured down below. Water freely and give liquid cow manure once a week, when half grown. Plant out when 4" or 5" high in trenches 18"-20" deep. Remove outer stalks and earth up gradually with dry soil, after plants are 12" high. A circle of thick brown paper put round the stems before earthing is safest. A month to six weeks later the Celery will be ready to cut.

Curled Cress—*Halim*. *Haloon*. (*Lepidium sativum*). Ready in 1 week. Sow on the plains, September-February. Hills, March-September. Soil light, rich. Water well, sow broadcast once a fortnight in shallow boxes and cut for salad when a couple of inches high. Can be grown all the year round.

Capsicum (Pepper) (*Capsicum longum* var : *grossum*). Sow on the plains August-September transplant in October-November to pots or ground, soil light rich. Hills, February-April. Ready in 3-4 months.

Kohl Rabi. *Gant Gobi*. *Ole Kobi*. (*Brassica oleracea* var *caulirapa*). Distance apart 9"-12". Ready in 2-3 months. Sow on the plains August-November. Hills, February-June. Soil heavy but rich. Water profusely and give liquid cow manure once a week when half grown. Transplant when 3'-4" high, in rows 15" apart. Cut when about 3" in diameter. Make successional sowings,

Leek. *Belati Piaz, Kirath, Mosli or Mallat Piaz.* (*Allium porrum*). Distance apart 6"-9". Ready in 2-3 months. Soil rich, sandy. Sow on the plains September-October. Hills, February-April. Water freely. Transplant when 4"-6" high, in narrow trenches 15" apart and 6" deep and earth up gradually when the plants are two months old. Trim tips of leaves 2-3 times to make stem swell. Give as liquid manure 3 weeks before pulling, 1½ oz. Sulphate of ammonia, ¾ oz. Muriate of potash and ¼ Superphosphate once a week.

Lettuce. *Salad, Kahoo.* (*Lactuca sativa*). Distance apart 9"-12". Ready in 2-3 months. Sow on the plains July-January. Hills February-June. Seeds germinate slowly. Soil light, rich. Water freely. Tie up Cos when plants form 10-12 leaves and give liquid manure occasionally. Three types, Cos, Cabbage and Loose leaf. Can be transplanted from boxes. Sow successional crops, ready for use in 40-45 days.

Mustard. *Rai.* (*Sinapis alba* and *S. nigra*). Sow on the plains all the year round. Hills March-September. Treat exactly like Curled Cress, or transplant into rows 6" apart and 15" between rows. Soak seed two hours before sowing for quick results.

Onion. *Piaz.* (*Allium cepa*). Ready in 3-4 months. Sow in June for early crop. Plains September-November. Hills March-June. Soil firm, rich, dig in a good quantity of wood ashes and old mortar. Sow broadcast, and thin out to 8"-12" apart. Manure well and water freely. Transplanting can be done when 6" high. Acclimatised seed is very good. Patna strain seed takes three weeks to germinate and should be soaked. When tips of leaf turn yellow bend stem down flat on bed 2" above bulb, this prevents running to seed and increases size of bulb.

Parsley. *Ajmod, Petercola.* (*Petroselinum sativum*). Sow on the plains August-November. Hills March-May. Distance apart 6"-9". Ready in 1-3 months. Soil rich and heavy, water moderately. Partial shade necessary. Sow broadcast and thin out. Used for garnishing and flavouring. Cut back when signs of flower appear and further leaf will be the result.

Parsnip. *Jujur, Istupin.* (*Pastinacea sativa*). Sow October-November. Broadcast and thin out to 9" apart or sow in drills 18" apart, treat like Carrots, bury manure 9" deep, let top soil be moderately rich only.

Peas. *Matur.* (*Pisum sativum*). Sow on the plains October-January. Hills, February-May. Distance apart 3". Ready in 1½-3 months. Soil deeply trenched on the heavyside, rich. Sow seed 2" deep and when the plants are four inches high put in dhaincha, bamboo or jute sticks to support peas, in a double line in each row and clamp in the plants a foot apart as they grow up the sticks. Water heavily in dry weather otherwise pods will become stringy. Sow acclimatised Peas, early type, from October to end of January. Water freely when in blossom, twice a week when pods form. To get full pods, pinch tip of plant when first pods form. Do not pull pods, cut them. Plant in double rows each row 12" apart and their own height between rows, running north and south. Use ½ oz. of Nitrate of soda for yard row watered in. There are several sections of Peas, Early, Mainerop and Late while Earliest of All is a further advance. The mainerop and early types are suitable for the plains. The dwarf variety does not require much staking. A medium growing variety is recommended in preference to either tall or dwarf. If foliage becomes yellow it often means that the plant is short of Nitrogen.

Peas Country variety "Olanda" is sown broadcast in fields and allowed either to ramble on thorn branches or flat on the ground.

Radish. *Muli.* (*Raphanus sativus*). Sow on the plains from August to January. Hills, March-May. Distance apart 3". Ready in 3 weeks to 1½ months. Soil light and rich. Sow seed broadcast or in drills at intervals of a week, after reaching maturity the roots become pithy and unfit for use. Slight shade advantageous, commence pulling after 4th leaf has formed, dig the soil deeply and pulverise, thin out to 3"-4" apart.

Sorrel. *Choka or Katha Palam.* (*Rumex acetosa*). Sow on the plains September-November. Hills, February-April, broadcast and thin out to 9" apart. Ready to cut within two months.

Spinach. *Isfaney, Palak Sag.* (*Spinacea oleracea*). Distance apart 9"-12". Ready in 3 months. Sow on the plains September-November. Hills, February-April. Soil light, rich. Water freely. Sow broadcast and thin out.

Tomato—Goothaigan. *Tamatar. Belaiti Baigan.* (*Solanum* or *Lycopersicum esculentum*). Distance apart 24"-36". Ready in 3 months. Sow on the plains July-November. Hills March-June.

Soil light, rich, but can be grown in any soil. Plant in rows 24"-36" apart, support on stakes, jaffrey or netting. Water heavily with liquid manure when in flower so that the fruit may set well, 1lb of Superphosphate per 5 sq. yard should be used after fruit has set, thin out fruit if the plant seems overladen. Transfer to boxes and small pots when 2" high and transplant when the rains are over. Pinch off leaders when fruit begin to set. Never let plant get too moist, this is a fatal error. Fruit with hard portions unripened shows absence of Potash. Use Sulphate of potash.

Turnip. *Salgam.* (*Brassica rapa*). Distance apart 6"-9". Ready in 3 months. Sow on the plains August-December. Hills, February-June. Soil light, rich, sow broadcast or on ridges 9" apart. A root vegetable of easy culture. For Turnip fly use Soap and water solution syringed on, 2 ozs soap to 1 gallon water.

Vegetable Marrow. Squash. *Belaiti Komrah. Nirphul.* (*Cucurbita Melo-pepo ovigera*). Sow 3 seeds in a triangle of 12" diameter. Distance 6 feet apart. Ready in 3 months. Sow on the plains August-January. Hills, March-June. Soil highly manured, pinch tip when first flowers open, allow to ramble on the ground, or on dead branches of trees laid on the ground. Trailing vegetables require space. Attacked by fly, beetles and grub in fruit. Dust with ashes or use insecticide.

Water Cress. (*Nasturtium officinale*). Ready in 4 weeks. Sow on the plains, September-February. Hills, March-September. Soil light, rich and porous. Grow in gravelly soil with slowly running water, also on spent stable manure kept well watered and sheltered from direct sun.

HERBS.

Aniseed, *Sauf.* (*Pimpinella anisum*). Sow broadcast in October-November or in drills 15" apart and thin out to 6" apart, ready in 3-4 months.

Basil. *Gulal tulsi.* (*Ocimum basilicum*). Soil good but not too rich. Sow in pots August-September and transplant 12" apart on raised beds or in pots. Can be grown all the year round.

Carraway. *Jira.* (*Carum carui*). Sow broadcast and thin out 1' apart. Sow from June-November, matures March-April.

Coriander—*Dhaniya*. (*Coriandrum sativum*). Sow broadcast August to October in shallow drills and thin out to 1' apart. Ready in 3-4 months.

Dill. *Sowa*. (*Peucedanum graveolens*). Sow August-November in shallow drills or broadcast and thin out 1' apart. Ready in 3-4 months.

Fennel. *Sauf*. (*Foeniculum vulgare*). Sow October-November in shallow drills and thin out to 1' apart. Ready in March.

Fenureek. *Methi*. (*Trigonella Foenumgraecum*). Sow broadcast August to November ready in 3 months.

Mint. *Pudeena*. (*Mentha viridis*). Plant cuttings 9" apart in June-July on a raised bed in light sandy soil and manure heavily after the rains. Slight shade gives best results.

Sweet Marjoram. *Bantulsi*. (*Origanum marjorana*). Sow August-September. Plant 9" apart. Ready in 3-4 months. Soil rich and light. Cut top for drying as flower appears. Perennial.

Thyme—(*Thymus vulgaris*). Ready in 3-4 months. Sow August-September. Perennial. Soil light, sandy. Rather delicate on the plains, unless kept as a pot plant.

Sage—*Seesti* (*Salvia officinalis*). Distance apart 18". Ready in 3-4 months. Sow August-September. Soil rich and sandy with good drainage. Transplant when 3" high. Keep in pot. Perennial.

Small leaved Fennel. *Mungrela*. *Kalajira*. (*Nigella sativa*). Sow September-October, broadcast and thin out 6" apart. Soil ordinary ready in 3-4 months.

NOTE.—On the Hills sow all these Herbs from February to May.

COUNTRY VEGETABLES.

These varieties are cultivated on the plains or at low elevations during the hot and rainy seasons when imported winter vegetables cannot be procured.

Though not as varied or delicious as the imported kinds a careful chef can turn out many a tasty dish. The common English

name is given first, the vernacular name being in italics and the Latin within brackets.

Asparagus or Cuba bean. *Burbully. Lobia.* (*Vigna sinensis. V. cattiang var lobia*). Distance apart 5'. Ready in 2 months. Sow March-July, in position giving support. A runner bean bearing long slender pods 6-12 inches in length and the thickness of a lead pencil, used in curries or boiled as a vegetable. Soil light sandy loam. Cow Pea is a white seeded variety used chiefly for green manuring.

Balsam apple. *Uchia. Kareli.* (*Momordica muricata*). Distance apart 5'. Ready in 2-3 months. Sow September-November A small fruiting variety of the Karela, treat similarly.

Beet-root Spinach. *Palak sag. Palum.* (*Beta maritima*). Ready in 3 weeks. Sow broadcast in September-October, thin out to 12" when 4" high. A well known substitute for spinach. Soak seed first for 48 hours. After each cropping give a fertiliser and cut out flowering shoots.

Bitter Gourd. Balsam Pear. *Karelu.* (*Momordica charantia*). Distance apart 5'. Ready in 2-3 months. Sow in holes or trenches October to March. A climber, bearing gourds 6-8 inches long by 3-4 inches in diameter, green covered with warty protuberances; when ripe the fruit becomes orange in colour and splitting shows a number of scarlet seed within. Used when unripe in curries, etc. Soil ordinary.

Bottle Gourd. *Lau. Laukee. Alkaroo* (*Lagenaria vulgaris*). Early and late types. Distance apart 6' Ready in 3 months. Sow February-March and August-September in position. An annual creeper, the tender tips and even the leaves being eaten by the Indians while the immature gourd is used as a vegetable, boiled or curried; fruit 16-24 inches long varying considerably in shape and diameter. Does best on a thatched roof. Soil light, manure the same as for Cucumber.

Brinjal. Egg plant or Aubergine. *Bagoon.* (*Solanum melongena.*) Muktakeshi, Kuli, Benares, Aman, Aushee. Distance apart 3'-4'. Ready in 4-5 months. Sow Aman, Muktakeshi, Aushee, September-October ready February-May. Sow Kuli and Benares in February-March, ready August-January. A shrub 2½ to 3 feet

high, fruit purple or white, differing in size and shape according to the variety, used in curries or fried in a variety of ways. Raise in a seed bed and transplant 3 or 4 times, at intervals 15 days to increase size of individual fruit; pick off all but two or three when they are the size of marbles. Shelter from north winds. Earth up when 18" high. Soil light, heavily manured, surface dressing of $\frac{1}{2}$ lb. cow dung and well rotted mustard oil cake in equal proportions per plant when fruits set. Red ants and caterpillars also leaf-curl are chief pests.

Cape Gooseberry. *Teparee.* (*Physalis peruviana*). Distance apart 2'-3'. Ready in 6-8 months. Sow April-June in a seed bed and transplant to 18"-24". A dwarf shrub which bears the well known berry contained in a dry capsule like a Chinese lantern, eaten when ripe or used in jams, etc. When about 9 inches high earth up the stem for 4 inches or so. Soil light and rich, raised as the plant does not stand water logging.

Ceylon Spinach. Malabar nightshade. *Pooye Sag.* (*Basella alba, rubra* or *cordifolia*). Ready in 3 months. Sow March-June direct in the ground giving support. A perennial climber with fleshy green or purple stems and leaves, the tender shoot and leaves are used in fish curries, etc. Soil ordinary.

Chevaux de frise bean. Goa bean. *Char Koni sem.* (*Psophocarpus tetragonolobus*). Distance apart 5'. Ready in 4-6 months. Sow March-June direct in the ground. A heavy climber bearing beans 6-9 inches long with leafy fringes along the four corners of the pod; eaten in curries or as a vegetable. Soil ordinary.

Chili. *Lalmirich. Mircha.* (*Capsicum frutescens*). Distance apart 2'-3'. Ready in 2-3 months. Sow March-June in a seed bed. Too well known to need description, very hot and pungent. Soil ordinary though a little old cow manure worked in will do good. This must not be confounded with the *Capsicum* which is a sweet fleshed fruit.

Club or Sponge Gourd. *Jhinga. Turoi. Kali Turoi.* (*Luffa acutangula*). Early and late types. Distance apart 5'. Ready in 2-3 months. Sow in position February-May. A climbing plant which bears fruit 10-18 inches long, green with sharp ribs projecting from end to end, when half formed used in curries. Pinch back

the shoot to assist the fruit to set, soil sandy, cow manure given when fruit forms.

Country Bean. *Sem.* (*Dolichos lablab*). Kholkhas black and white, Altapati black and white, Ghiya, Bagh noki, Makhan, Hatikhana. Distance apart 5'. Ready in 4-6 months. Sow May-June in position giving support, 6"-8" apart and 5' between rows or up fencing, shrubs etc. There are many varieties of this twining bean, varying in size and shape of pod though most are like a flat French Bean or Lima Bean, 3" long, green or purple in colour. Used in their immature state as French Beans. Soil light with a little old manure worked in before planting, assist with liquid manure when 3'-4' high. Shelter from north winds.

Cucumber. *Kakri.* (*Cucumis melo var. utilissima*). Distance apart 5'. Ready in 3 months. Sow January-March. This is the long Chichinga-like fruit used in salads. Soil sandy, heavily manured. Plant seed in holes or trenches.

Cylindrical Sponge Gourd. *Dhoondool.* *Ghiya Taroi.* (*Luffa aegyptica*). Early and late types. Distance apart 6'. Ready in 3-4 months. Sow March-June in position. Soil rich but light. Like the sponge gourd in general appearance. A very spreading climber usually grown up a tree, fruit used in curries.

Deccan Hemp. *Mesta.* (*Hibiscus cannabinus*). Distance apart 4'. Ready in 2-3 months. Sow March-May in a seed bed and transplant. The tender leaves of this plant are used as spinach and the old stem provides a good quality fibre for string.

Ground nut. *China badam, Mungphali.* (*Arachis hypogea*). Sow June-July, 2" deep and about 2½ feet apart. Soil must be light and not heavily manured. Crop ready in February. Ashes and silt if procurable are good for this crop, use medium sized nuts and sow in shell.

Gumbo. Ladies Fingers. *Bhindi, Vundee, Ramtaroi, Dharos, Okra.* (*Hibiscus esculentus*). Distance apart 18"-24". Ready in 4 months. Sow March-June either in seed beds or direct in the ground, when 12'-15" high take off tip. Soil light but heavily manured. These plants grow from 3-5 feet high with horn-like pods 4-6 inches long; eaten either boiled or fried but objected to by many owing to the mucilage which appears when cooked,

Indian Corn. Maize. *Bhuta. Makkai* (*Zea Mays*). Distance apart 12". Ready in 3-4 months. Sow March-June direct. A tall growing plant, 3-6 feet high bearing 2-4 cobs per plant, eaten when tender in a variety of ways or parched when mature. Soil light but not too well manured, earth up the plants when a foot high, to 4 inches. Successional crops can be obtained by planting from January onwards. Acclimatised varieties are best for the plains.

Indian Purslane. *Kulpha sag.* (*Portulaca oleracea*.) Ready in 2 months. Sow broadcast every fortnight, from March to June. A succulent weed which has an acid taste and enters largely into the make up of the various mixed spinach dishes used by the Indians of the poorer class.

Indian Spinach. *Sag, Notia, Danta.* (*Amaranthus* species) Ready in 1 month. Sow February-August broadcast, or in drills, 18" apart. There are many types of these soft wooded annuals, differing in size and colour of foliage. The leaves, and in some cases, even the stems, are used in curries and as spinach. To obtain a succession plant every month, pluck when 9-12 inches high. Soil light and rich for the best results and occasional doses of liquid manure during growing season.

Melon. *Phootee. Kachra. Tuti.* (*Cucumis Melo* var : *momordica*). Distance apart 5". Ready in 4 months. Sow February-May direct in the ground in holes or trenches, soil river silt. This is like a large white cocoon in shape bursting when ripe, hence the vernacular name; used as a desert fruit with sugar and flavouring or when unripe as salad.

Musk or Marsh Melon. *Khubruza.* (*Cucumis Melo*). Distance apart 5'. Ready in 3 months. Sow October-February direct in the ground in holes or trenches. Soil light and sandy. A trailing gourd bearing fruit which varies in size and shape according to variety; usually about 7-8 inches in diameter. Eaten when ripe as a desert, delicious. Lucknow Sufaida is one of the best.

Palwal. *Patal.* (*Tricosanthes dioica*). Distance apart 18". Ready in 4 months. Seldom grown from seed but roots planted in August-September. A pumpkin like plant bearing small cucumber like fruit. Plant in a shallow trench, 18" apart in well manured soil. Fill in the trench when shoots are a foot long and grow on the surface of the ground.

Radish. *Muli. Murai.* (*Raphanus sativus*). Contai, Bombay, and Patna. Distance apart 12'. Ready in 3 months. Sow March-May and again August-January direct in the ground and weed out to 12 inches apart for Contai which is the long rooted variety chiefly used in curries. The soil should be ploughed several times before the crop is sown and heavily manured. Soil light well drained and heavily manured. The variety sown during the rains produces only leafy tops used as greens and is called Sigri Muli.

Red Pumpkin. *Lalkomrah. Suffi. Kaddu. Kumra. Sitaphal.* (*Cucumis moschata*). Distance apart 5'. Ready in 3-4 months. Sow February-June in position. The summer type is grown on the ground. A quick growing creeping or trailing plant bearing large globular fruit, green or brownish red in colour, eaten immature or ripe, boiled or in curries, also made up into sweetmeats. Flesh red, the mature fruit keeps for sometime after being picked, the flowers and tips of vines are also eaten. Soil light but heavily manured, kept moist but not too wet.

Ridge-Cucumber. *Khira-Sasa.* (*Cucumis sativa*). Early and late types. Distance apart 5'. Ready in 3-4 months. Sow February-June in the Plains. On the Hills March-May. A creeper, bearing fruit 6-12 inches long 3-4 inches in diameter used raw in salads or when mature cooked in a variety of ways. Bhuya is the type grown without support. Soil ordinary, manured with small quantities of bone meal, castor oil cake and old cow manure in equal parts. Sow direct into the ground in circular holes of 18" diameter, 12 inches deep filled with richly manured soil. Sow three seeds in a triangle 5 inches apart and use wood ashes to keep off beetles. Tip the vine when three or four fruit have formed.

Roselle, Indian or Red Sorrel. *Palwa.* (*Hibiscus subdarriifera*) Distance apart 6'. Ready in 6 months. Sow March-May in a seed bed and transplant. This perennial plant grows from 3-8 feet high and the succulent fleshy calyces are used in tarts and jams. The tender tops and leaves are also eaten in curries. Soil heavy and rich.

Snake or Club Gourd. *Chichinga. Hampa.* (*Trichosanthes anguina*). Distance apart 5'. Ready in 3 months. Sow March-April in position and give support. A quick growing climber with long greenish cucumber like fruit, striped with white, or entirely green,

3-6 feet long and 2-3 inches in diameter. Used boiled as a vegetable or in curries.

Squash Melon. *Dilpasaul. Tendu. Tensi.* (*Citrullus vulgaris* var *fistulosus*). Distance apart 5'. Ready in 3 months. Sow February-March treat like the Water Melon. Gathered when the size of Turnip and cooked as a vegetable like Pumpkin or Squash.

Sweet Potatoe. *Sakukund.* (*Ipomea batatas*). Distance apart 3'. Ready in 6 months. Plant cuttings in April-June. Soil light. A climbing plant belonging to the Convolvulus family producing tubers from nodes of the plants which are buried in the soil. Plant cuttings 9" long on the ridges of shallow trenches and when these have grown, press down the stems every few feet.

Sword Bean. *Mukkum or Bara Sem.* (*Canavalia gladiata*, *ensiformis*). Perennial, Distance apart 5'. Ready in 4-6 months. Sow in position March-June 3" deep. A robust woody climbing bean, bearing pods 8-12 inches long and 1½ inches broad, eaten when young as a vegetable or the red or white seed when the pods mature. Does best up a tree. Soil ordinary with a small quantity of cow manure. A dwarf variety is also a first class type for small gardens.

Water melon. *Turboosa. Kharbuza.* (*Citrullus vulgaris*). Distance apart 5'. Ready in 4-5 months. Sow October-January. A trailing gourd, fruit eaten as desert. Soil sandy with river silt, heavily manured with old cow manure, do not let collar of plant get too wet otherwise the stem will canker, usually cultivated in the dry bed of a river.

White Goose-foot. *Bathoa sag.* (*Chenopodium album*). A tall growing plant used as Spinach. Sow broadcast in August-October and thin out to 12". Ready for cutting within a month.

White Gourd. Ash pumpkin. *Chal or Pance Komra. Bhatwa. Sachi.* (*Benecasia cerifera*). Distance apart 5'. Ready in 4-6 months. Sow February-March, direct in position. A large climbing gourd usually run on to a roof where it bears oblong fruit, when ripe covered with a waxy grey bloom, used as a vegetable or candied for sweet meat, Phetal. Soil ordinary.

Velvet bean. *Kumach. Tohar Sem.* (*Mucuna nivea* or *Stizolobium pachylobium*). Distance apart 5'. Ready in 4-6 months.

Sow April-June direct in position. A climbing perennial bean, the large fleshy pods are eaten when tender as a vegetable or in curries, pods borne in clusters, each 3 inches long with dark green or black velvety skin. Soil ordinary. Be careful of the variety with stinging hairs (*alkusi*).

Yam bean. *Sankalu.* (*Pachyrrhizus tuberosus* or *angulatus*).— Distance apart 3'. Ready in 4-6 months. Sow March-June in position. A strong growing creeper with a large edible tuberous root which is taken up in the cold weather. The pods should not be allowed to mature, but eaten in the tender state. Soil light, must not be allowed to climb, but grown on ridges like the Potatoe and the vines allowed to ramble.

Yam. *Kham alu. Jamin kund. Ratalu.* (*Dioscorea batatas, sativa*, etc.) Distance apart 5'. Ready in 9 months. Plant April-May. Quick growing climbers producing large coarse looking tubers of varying sizes. These, when properly prepared, taste like dry Potatoes. Plant bulblets or cut portions from the top of tubers in a prepared pit 2 to 4 feet deep filled with light sandy soil and old cow manure.

CONDIMENTS.

Mangoe Ginger. *Amada.* (*Curcuma amada*).

Ginger. *Udrak, Ada.* (*Zinziber officiale*).

Turmeric. *Halud, Haldi.* (*Curcuma longa*).

Plant mature rhizomes 3" long in May-June, in parallel furrows 15"-18" apart and earth up when plants are 12" high. The soil should be light and rich and well raised. Old cow manure and oil cake should be dug in before planting sets; if grown in semi shade will give better results. Ready October-March

Onion, Patna or Bombay, plant offsets in October, 6"-8" apart ready in March-May. Oil cake should be dug into the soil before planting. Soil ordinary.

Garlic. *Lasun* (*Allium sativum*). Plant bulbils in drills 9" apart and 15" between rows. Plant out in October-November. Ready in March,

Mushroom. *Chattri.* (*Agaricus campestris.*)

Position. Natural mushrooms are found in open spaces where horses have been exercised or in light jungle land but the artificial cultivation of mushrooms is usually done under shelter. Make a bed in a shed with a back wall, facing north, but open on both sides, and closed to the south. An open or slightly dark cellar is often used. In the open a bed can be raised beneath a wall facing east, anything from 2'-4' high and about the same in width.

Time of Sowing. The Mushroom bed should be started as soon as the monsoon breaks in June.

Preparation. The first essential is correct preparation. Procure fresh stable manure and pick out all the long straw, stack it in a heap for a week and every two or three days open up the pile and allow it to cool before re-stacking. After three or four turnings the manure will have lost its sour, disagreeable smell and be ready to make into beds or ridges. The shape depends a good deal on the space available but on no account make flat beds. Often the best are made on shelves one above the other, this gives more space and consequently a larger bearing surface but strong supports are required for the shelves. Each shelf should be nothing under 2½ feet wide and separated at least 2 feet from the one above. The usual beds are of ridge formation, 2 to 2½ feet wide at the bottom rising from 18" to 3' in the centre. When the manure is ready, beat it down into shape and allow it to stand for a few days till the temperature, taken with a thermometer, registers 70 to 85 degrees: it is then ready for spawning. Some growers recommend the addition of leafmould in equal quantities to stable manure, others get their best results when one part of light loamy soil is added to seven parts of stable manure but 3 : 1 of manure and soil is the best proportion.

Spawning. Before using the tablets or bricks they should be wet on both surfaces and kept in a moist warm place for a week, this will revive them and when ready for use will be uctuous and fatty to the touch having the characteristic smell of the mushroom should a piece be split open. Break the cake into small pieces about 1½" to 2" across and place these 6 to 9 inches apart in intimate touch with the manure, cover with two inches of finely sifted garden soil and beat down lightly. Some cultivators recommend the spawn being left uncovered for 3 to 6 days to help the sporangia to develop and

then covering with earth. Over the soil a layer of soft straw litter should be spread 4 inches thick to retain the heat but this should be removed occasionally as otherwise the spawn will rot. Never water the bed except in very dry weather when a slight sprinkling will suffice. Wet the ground and walls and thus keep the atmosphere of the shed moist.

Picking. In six to ten weeks mushrooms will be ready for picking, twist off the mushroom when it is in the button stage and do not cut as rot sets in and may damage the entire "stool". Remember that the edible mushroom has a whitish brown skin and pink gills which become dusky brown with age. When the bed shows signs of becoming exhausted a little salt water or liquid manure should be syringed on, both are good stimulants.

Potatoe. *Lili.* (*Solanum tuberosum*).

Soil. This must be made as fine a texture as possible, not full of gravel or stones, cultivate deeply and pulverise the soil thoroughly.

Varieties to grow. Imported kinds from the Hills are in all probability acclimatised *Magnum Bonum*. Italian round white, *Gauhati* and *Nainital* are also in general cultivation.

Planting. Keep the potatoes spread out in a cool, shady spot till the eyes commence sprouting. If the tubers are cut for planting, allow 2 eyes per piece, rub the cut portion in clean wood ashes and slaked lime in the proportion of 3 : 1. Let the cut dry for a day before planting. Either cut tubers can be planted, this gives a larger area per weight of seed potatoes, or entire potatoes. Plant at distances of 12-15 inches, on the Hills about 18"-24" apart, and cover with 4 inches of soil. Season September to November on the plains and on the hills January-February. A second crop is often sown in July-August on the hills which is harvested in November-December.

After Treatment. The sprouts should show above ground in a week or 10 days, do not water up to this period and afterwards give only very small quantities as this produces strong plants.

Earthing. When the shoots are 6"-9" high give a thorough watering, allow the soil to dry then hoe the space between rows and commence earthing up in ridges four inches high. A fortnight later

water again, hoe and raise the bank to the final height of 9'-12", keeping earth loose.

Watering. After banking up the earth the second time one final watering will be necessary. Too much watering when the plants are full grown results in the tubers rotting.

Manures. Old cow manure or oil cake with wood ashes is dug in preparatory to planting, but the quantity depends really on the state of land. 10 maunds of dung and 10 of oil cake per bigha (¼rd of an acre) is used in general practise. Potash in the chief requirement of this crop

Harvest. When plants die down entirely between February-March on the plains and on the hills June-July.

Storing. Keep in an airy godown, with the tubers not touching. If soaked for a couple of hours in a 2% solution of sulphuric acid they will keep better.

Lucerne. Alfalfa. (*Medicago sativa*). This is a very easily cultivated green crop belonging to the Pea family, equally beneficial to all live stock, but should be given in small quantities, as an appetiser. A small patch should be a *sine qua non* to every dairy and farm-yard.

Soil. This should be light and so placed as never to get water-logged, see that water drains off readily after heavy rain, dig deep and manure heavily with old stable or cow manure.

Sowing. The quantity of seed required for an acre is 15 to 20 lbs. if broadcast. Make up the field into small 10' square beds with a channel between each, sow the seed and rake it in. The crop can be cut for three years in succession without renewing the plants but though Lucerne is a perennial and can be grown indefinitely, it loses vigor after this period. After the second year bone meal at the rate of 4 cwt. per acre should be dug in. If sown in ridges 24" wide and three feet between each ridge, only 10 lbs. of seed will be required per acre. Irrigation must be given when the plant looks wilted during the warm weather but the quantity of moisture depends on soil conditions and period of the year. To keep Lucerne growing well a mulch of well rotted stable manure should be forked in every few months.

Lucerne grows from sea level up to an elevation of 6000' and can stand a variation of rainfall between 14 and 65 inches. Sow the seed just before the rains break or immediately after the Monsoon is over, but if irrigation can be provided the seed can be sown at any time. The crop is ready within a few months and should be cut when the growth reaches a height of 12-18 inches; the best results are obtained between the 2nd and 3rd year and from a well grown crop 6 to 9 cuttings can be gathered every year.

Pests. The chief pest of Lucerne is a small green caterpillar which can be easily destroyed by flooding the crop after it has been cut down.

As Lucerne belongs to the Pea family it adds nitrogen to the soil and is often grown as a green crop on virgin soil to inoculate it with nitrogen bacteria before the ground is turned for a new vegetable or flower garden.

Berseem. (*Trifolium alexandrinum*). This fodder crop is coming into favour because it is a quicker grower than Lucerne and gives better results especially in districts where Lucerne fails to prove satisfactory.

Sowing. The soil should be prepared as for Lucerne but damped thoroughly; soak seed for 12 hours prior to sowing. Quantity required 30 lbs. per acre. Season of planting August-September immediately after the Monsoon.

A crop can be gathered 2-3 months after sowing and one cutting a month be counted on till the plant dies in May. Flood after each cutting. Berseem will not stand great heat and unless started early is liable to be damaged by excessive cold in December.

Dracaena. *Varieties* refer to distinct kinds in one species, the different kinds of *Croton*, for instance.

2. **Annuals in Pots.** Stage the clearest and prettiest colours, one variety in a pot if possible, each plant neatly and naturally supported with stakes neither bunched together nor artificially arranged in a fan or ball. Judge the growth of an annual before you pot it, one *Salvia splendens* in a 10" pot gives a fine plant, 3 would be too crowded. A single *Aster* is lost in a 10" pot but in an 8" pot is ideal.

How to Prepare. A certain amount of disbudding and tipping of shoots is permissible, an *Antirrhinum* reduced to a single shoot may produce a finer spike of flower than one grown naturally but will not receive the points that an unpruned specimen will. One colour should be grown in a pot, except perhaps in the case of *Portulaca*, but a pot of 3 shades of *Phlox* is not considered good. Do not over manure.

3. **Cut Flowers.** Do not bunch too many flowers in a vase, arrange lightly with no "helps" such as wiring or grasses unless this is allowed. Here again good taste often weighs with the judge, clashing colours, purple *Clarkia*, scarlet *Salvia*, a mixed bunch of *Pinks*, all in their own way might be excellent, but for an exhibit of "so many vases" colours should not be contrasted.

Sweet Pea. Try and get 3 and 4 flowered stalks and good shades, avoid grey flakes and majenta, etc. *Antirrhinum*, self colours are preferable and good full spikes with no bend in them. *Canna* large full heads of shades not too much alike, nor drooping, the *Dreadnaught* are the exhibition type. *Hollyhock*, *Heliotrope*, *Poppy* and flowers that fade rapidly should never be staged while imported *Phlox* is preferable to the acclimatised.

Roses. An exhibition rose has a high centre, does not open up and show a heart, Paul Neyron for instance, is a huge coarse flower but has not the delicate points of Frau Karl Druski which must be shown while still in bud and not fully open

Japanese Chrysanthemums. Specimens can be gross, with coarse petals and have an overfed look; delicate colours, well arranged petals and a fair size, always count. *Dahlias* should have stiff stems which require no propping and the *Paeony* and *Show* types are much

preferred to the Pompom. In any case the flower should not droop its head.

How to Prepare. Where specimens of Carnation and Antirrhinum are required, remove extra buds of the former leaving the one terminal bud, and all the side shoots in Antirrhinum. Other flowers, Sweet Pea particularly, are improved by removal of extra buds and stems, rather than by manuring. Cut off dead flowers as they fade and do not allow seed to set. Manuring should stop as the first buds burst but continue to give plenty of water. Choose a good strain from a reliable seedsman as on this more than half your success will depend.

When staging, do not give name of variety or strain of seed purchased or the name of nurseryman who supplied the seed, unless this is particularly asked for in the Schedule.

Lupin, Clarkia, etc., which are liable to droop and form an ugly bend, seldom come straight again and should, when cut, be carried head downwards wrapped closely in newspaper with a thin stake to keep them in position. The cut ends should also be wrapped around with damp moss or paper.

Tissue paper must be used to wrap each separate bloom when taking flowers to a distance for exhibiting; always carry a good few extra in case of accidents.

Arrange with natural foliage when this is allowed, and prepare a plan of how you desire to arrange a group of plants or flowers before you start work. When arranging, split the cut ends and see that the vases are filled with water so that evaporation may not leave your stems high and dry after a couple of hours. Let the cut ends rest deep in water but try and avoid their touching the bottom of the receptacle.

When to cut. Always cut flowers before sunrise if possible, picking half blown buds, char stems of Poppies or dip them in boiling water for a second. Pull up dwarf annuals by the roots and place in water after washing off the earth. Hard wooded stems should be split in four for a distance of a couple of inches. A pinch or two of *Salt, Aspirin or Camphor* added to the water in which flowers are arranged helps to keep them fresh longer than usual.

Poinsettia should have all the green leaves removed, or the stem charred on the plant and cut beyond the burnt portion. This will prevent flagging.

As a general rule let flowers lie in the bath of water for an hour or so before arranging.

Never crowd flowers in vases, arrange lightly. If flowers are faded dip the ends of the stem into hot water for a few minutes and then cut off an inch or so of stem.

4. Vegetables. Always exhibit fresh material and see that it is clean. Never prepare a root by trimming off the side rootlets, removal of extra leaves from *Cabbage*, etc., all are liable to lose you points. All samples in a section should be more or less one even size, a medium sized stocky root suitable for the table is far preferable to a gigantic specimen. Specimens should be free from bruises, burns, etc.

All *Turnip*, *Beet*, *Rudish*, etc, must be solid, uniform in size with unbroken skin and free from side roots. *Carrots* show a small core when cut, *Beet* a deep red in colour. Always remove faded leaves and also cut off fibrous roots when exhibiting. In *Knolkohl* the lower leaves on the bulb should be cut off ten days before the root is pulled.

Leaf types *Cabbage*, *Lettuce*, etc., must have the heart firm yet tender, uniform in size, cut off root leaving an inch of stem.

Peas, *Beans*, etc., should have pods well filled with seed, tender and of fair size. *Beans* should break with a snap when bent, *Tomato* should be of even medium size, with no wrinkles, a good bright scarlet in colour.

Cauliflower should have a white, firm even surface.

Quality should be coupled with a size suitable for the table and all vegetables rather on the immature side than past their prime.

Herbs and Condiments, etc., should be exhibited in a condition to be used. It is no use showing a leafy stalk of ginger or a flowering branch of *Asparagus* when the mature root of the former and the blanched shoot of the latter should be staged.

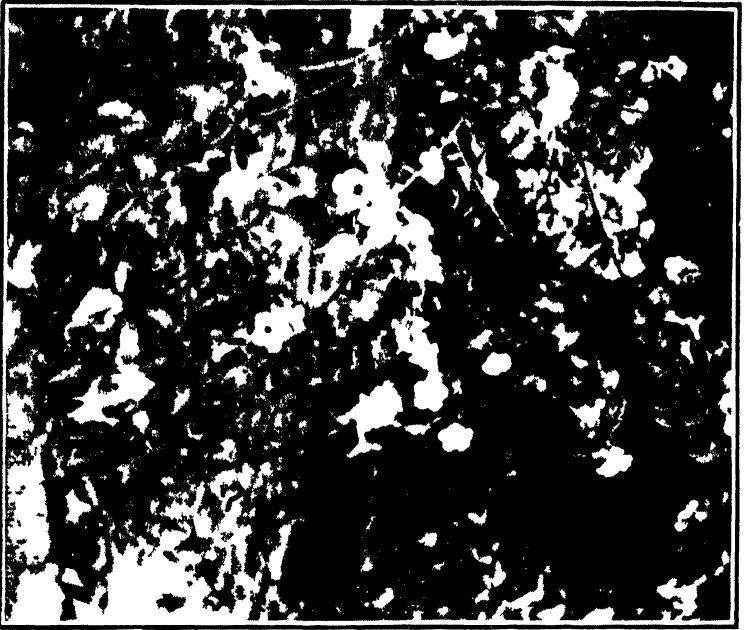
How to prepare. Get the best type of seed from a reliable source. Exhibition vegetables require more attention than



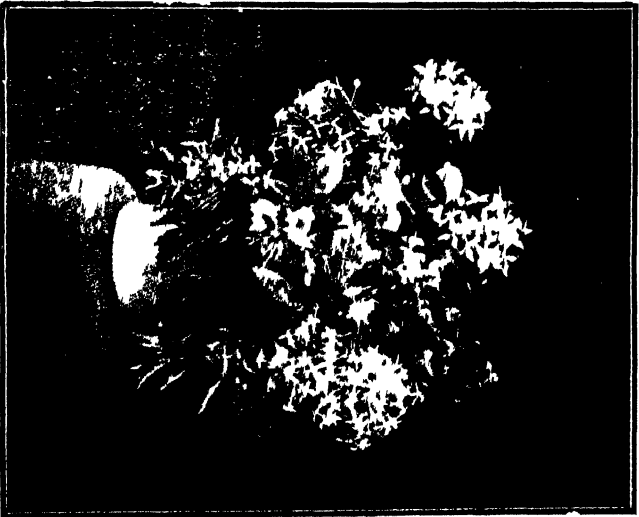
Nerium Oleander varieties.
(*Page 134.*)



Acalypha Sanderiana (*hispida*).
(*Page 127.*)



Argentea campanulata
(*Payer* 128.)



Ixora hybrid-
(*Payer* 132)

those meant for the table. See that Carrots and root types are sown in light soil with plenty of depth to allow the formation of good straight roots. Thin out Tomato fruit, bleach Lettuce by trying up, shade Cauliflower heads by covering with a leaf, reserve the very best plants and watch them carefully from the small state onwards.

Leek and Celery are difficult to bleach, do not exhibit unless properly done.

Gourds and Pumpkins must be at the stage when they are most in demand for the table.

5. **Fruit** should be just ripe enough to use on the table, of medium size and all of similar shape in one section.

How to prepare. Always have a good number of extras selected on the tree and cover the fruit with netting to preserve them from birds. Artificial ripening should only be resorted to in extreme cases, natural ripening gives a colour and flavour that cannot be imitated.

No bruised or damaged fruit must ever be shewn, and all must be fresh and not shrivelled.

Note.—The Agri-Horticultural Society has issued a note for the help of Exhibitors at their Flower Shows, a copy of which will be furnished to any one interested.

CHAPTER ELEVEN.

HEDGES.

Hedges are a very necessary adjunct to every garden, but should not be multiplied out of all reason. One must screen the manure pit, the servants quarters, etc. ; ornamental hedges are in their place and tall wind screens are sometimes necessary ; the question therefore arises what are the best hedges to plant.

It all depends on the site. For wire netting many climbers can be suggested, to grow up against a wall only *Ficus repens* or *stipulata* will do, while for shrub hedges several can be recommended.

Why to Plant. Do not uselessly plant up every path and road with a green edging. A flat brick edge, kept neat is far preferable. But the hedge is necessary when a demarcation between the flower and vegetable garden is required, the edging of a wild shrubbery or the masking of an untidy corner. A wind screen is also wanted when strong breezes from one direction are the rule at certain seasons of the year.

Distance apart to Plant. This depends on the ultimate size of plant whether it is a tree, shrub or low growing succulent. Trees should be planted 6 to 9 feet apart, shrubs 6 inches to 3 feet apart and *Altenanthera*, etc., (edging) an inch apart. *Duranta*, *Jawsonia*, etc., can be thickened when the hedge has grown up, by having the pruned cuttings planted in between the growing bushes.

Care of hedges. The first requirement of a hedge is really impenetrability and the next neatness.

Any prickly plant, such as *Inga dulcis* or the thorny type of *Duranta*, will not ensure an absolute cattle or thief proof hedge but run a barbed wire through the bushes 3 feet from the ground or plant a row of *Caraguata*, *Agave*, prickly Cactus or thorny *Euphorbia* at the base and the case is changed.

Always keep jungle away from the roots ; in the dry season fork up the soil and flood and when *Mendhi* or *Duranta* are pruned, during the wet weather, plant the cuttings so as to fill gaps.

Pruning of hedges. Some varieties have to be left to grow *au naturel*, Pandanus, Euphorbia, etc., but kept within bounds by the removal of side growth or the central head. In Euphorbia, Opuntia etc., the taller portion broken off can be replanted in the gaps to thicken the hedge.

For low hedges, 3'-6' high, clip frequently during the growing season if quick growing, and once a year cut back the old wood below the regulation height to restart a new top.

What to prune. The first year after planting merely tip the straight growth to make it branch out and cut back all spreading branches, later as the plant bushes out, the hedge can be squared to size.

How to prune. Use a sharp pair of pruning shears for small twigs but a secateur will be necessary for larger stems. It is best to stick to a simple shape instead of attempting battlements, turrets, balls, columns, etc. Arches can be grown on an iron rod bent to shape, the frame work of the shrub kept in position by being loosely tied with strong wire to the rod.

Shapes of hedges. A hedge is apt to become wedge shaped if not carefully clipped square, the top widening out. A rounded top is difficult to keep unless the type of hedge is compact growing and small leaved. Hedges are also cut on a slope but here too the mali often makes a mess of the shape. It is best to have wooden or iron stakes painted green, sunk in the hedge at intervals on which string can be tied and used as a guide. Stick to a square cut hedge.

What to grow.

Palms. *Kentia McArthurii* will grow 12-20 feet and not spread more than 4'-6' in width. *Rhapis stabelliformis*, on the other hand, while growing from 6' to 10' in height, sends out runners which must be constantly removed. *Areca lutescens* grows as tall as the *Kentia* but bushes out more.

Climbers. On wire fencing *Jacquemontia violacea* is ideal, *Ipomea palmata* (*Railway Creeper*) and *Antigonon* (*Sandwich Island Creeper*) are old favourites, *Passiflora pruinosa*, *Tristelletea australis*, *Thunbergia fragrans* and *Vallaris Hynesii* and for a very shady situation *Asparagus plumosus* and *Lygodium scandens* are suggested.

but not neat by any means while *Bougainvillea* can also be formed into an ornamental and thorny hedge.

Trees. For very tall hedges several trees lend themselves to pruning, *Polyalthia* (*Guatteria*) *longifolia* is one of the best, *Pongamia glabra* and *Inga dulcis* are also used. But *Thevetia nerifolia*, *Erythrina* of sorts, *Haematoxylon campechianum*, *Cryptomeria* and other conifers such as *Cupressus*, etc., are considered good when cut back to a height of 12 to 20 feet.

Pisonia alba (*Tree Lettuce*) forms hedges of pale coloured foliage in South India and Ceylon but is not grown elsewhere to any extent, *Casuarina* if pruned before a large trunk forms and *Acacia Farnesiana* are both useful, *Parkinsonia aculeata* should be only grown in dry situations.

Inga dulcis can be clipped and kept low and becomes impenetrable as those who have tried to force a way through soon discover. *Acacia modesta* is much grown in the Punjab and rivals *Inga dulcis* for wealth of thorns and neatness.

Shrubs. Coming down to hedges of 8'-12' height we have a long list.

Duranta in its many varieties holds first place here, the variegated type being very ornamental. Next comes *Lawsonia* (*Mendhi*) which is better in dry localities than in lower Bengal, and *Dodonaea viscosa* (*Sanatta*), also an upcountry hedge. *Dracaena fragrans* and *stricta* are evergreen and *Hibiscus liliiflorus* and *schizopetalus* excellent flowering types.

Murraya (*Kamini*) and *Tropis aspera* (*Sheora*) are slow growing but clip well, *Jasminum pubescens* (*Juli*), *Coffea bengalensis*, *Barleria* (*Jhanti*), *Leora*, especially *stricta* and *coccinea*, *Daedalacanthus* and *Strobilanthes* are flowering hedges that are well known and easily grown.

Lagerstroemia indica, though bare in the cold season, is a fine flowering hedge and two coloured varieties planted alternately give a pretty effect in a garden when in flower.

Sesbania aegyptiaca (*Jaint*) is another quick growing hedge, grown from seed and clipped, it is a great favourite in the drier parts of India for a tall boundary hedge. After two years it becomes ragged.

CHAPTER TWELVE.

POT GARDENING.

Pot gardening has become imperative for amateurs living in "flats" but successful growing depends a good deal on which side the verandah lies. If north, only ferns, palms, various foliage plants and shade loving flowers can be grown; a southern exposure calls for a very hardy type to withstand the summer heat without being scorched. East is good but the ideal situation is south east.

How to treat pot plants. Grow all your plants in 8 inch pots as the minimum size and ten to twelve inch for larger kinds, tubs and half casks are excellent but demand space. Smaller pots become dry quickly indoors and unless plants are constantly changed or continually kept moist they are apt to die.

Soil. A rather richer soil should be used than for ground plants. Good drainage too is essential but the compost of each section of plant must be considered. Follow the instructions given in Chapter Two.

When to repot. During the Monsoons repot everything. toss out the plant and in palms cut off the "wreath" of roots that forms at the bottom of most pots, and reduce the ball of earth slightly by rubbing off the edges. Scrub the pot inside and out with coir fibre and wash the crocks. Then replant using the compost recommended. Ram the earth round the ball and water thoroughly. Stand the plants in the shade and stake to prevent them growing out of the perpendicular.

Treatment—Cold Weather. During the cold months, do not water more than once a day and keep the plants out of the draught. To make certain that water has penetrated, once a month run a sharp stake down the side of the pot in 3 or 4 places and either dip the pot into a bucket till all bubbling ceases or else soak with water till it runs out from the bottom drainage hole. Never fill earth up to the rim of the pot, but allow $\frac{1}{2}$ inch to remain empty as this will help to contain water.

Treatment—Hot Weather. In the hot weather, plants can be watered twice a day, and syringed every evening. Give a thorough

Arancaria Cookii forms an excellent pot plant and is ornamental from a 6" plant to one 8' in height; given care it will be clothed from base to top with foliage — *t. Cunninghamii* is very prickly and coarser growing.

Sausseriera though not very beautiful, is hardy and stands a lot of rough treatment in sun or shade, *S. ceylanica* and *var Laurentii* are the best varieties to grow.

Ferns. are great favourites but some specimens of the ordinary Maiden Hair, as reared by careless amateurs, would make an angel weep.

Nephrolepis exaltata varieties are the hardiest for indoor work, *Pteris*, *Polypodium* and *Cyrtomium* are fairly hardy. In the Maiden Hair section, *Adiantum peruvianum*, *trapeziforme* and *hybridum* all large leaved types and stand fairly well, then *tenerum* of course is the common Maiden Hair and most useful.

Succulent and Semi-ever-green plants. *Aralia (Fatsia) Sieboldii* is very good, *Anthericum (Chlorophyllum) Ophiopogon*, *Erodia*, *Nandina domestica*, *Agave*, *Bullbergia*, *Curculigo*, *Cyperus*, *Dianella*, *Tradescantia discolor*, thornless Cactus and *Aloe*, *Cypressus*, *Juniperus* and other Conifers are all used on occasion.

Purely deciduous. In addition to *Croton*, *Elaeagnus*, *Dracaena*, *Coleus*, *Aralia*, and *Panax*, then we have the *Catadium*, though only in leaf for a short while, an admirable pot plant, *Dieffenbachia*, *Aglaonema*, *Alocasia*, *Maranta*, *Eranthemum* and *Graphytophyllum*, *Sanchezia*, *Poinsettia*, *Strobilanthes* and *Phyllanthus* also the tree *Grerillea robusta*. Quite a number to select from.

Flowering Plants in Pots. It must be clearly understood that no plants will flower indoors but many can be grown in pots and when in flower brought in. *Geraniums* and *Cineraria* last very well but are purely cold weather types.

Bulbs such as *Amaryllis*, *Haemanthus*, *Heimerocallis*, *Cooperanthes* and *Zephyranthes*, *Hedychium*, and *Panacratium*.

Orchids of many kinds *Phaius Wallichii*, a ground Orchid, *Dendrobium*, *Faula*, *Saccolabium*, *Aerides*, etc., are useful and can be grown in shallow pots around which moss can be arranged see Chapter Twenty Six.

Flowering Shrubs. *Pentas*, *Barleria*, *Coffea*, *Ixora*, *Hibiscus*, *Jasminum*, *Lantana*, *Malpighia coccigera*, *Ruellia*, *Rauwolfia*, *Turnera*, *Finca*, *Plumbago*, *Mirabilis*, etc.

The above are just a few that can be grown in 10' pots and give a return for some time. All flowering plants should be kept in full sunshine till the buds commence opening when they can be taken indoors. The shrub type are usually grown for the verandah only, unless very heavily covered with flower when they can be introduced to the drawing room.

Hanging baskets. These very useful decorations for verandah and window are going out of fashion, if carefully prepared they are quite a useful adjunct to the house.

Get a wire basket, line it with coir and as a compost use rather coarse screened earth with not too much leafmould and just a handful of cow manure. A small chatty sunk in the centre of a 12 inch basket will provide moisture during the drier months, and a crock cover prevent mosquitoes breeding, but this system can only be adopted if the basket is a large one.

Ferns such as *Adiantum ciliatum*, *Capillus Veneris*, *Polypodium* of various kinds or *Nephrolepis* of the *Piersoni* type form lovely hanging baskets.

A mixed basket usually has a small *Pandanus* or a *Palm* in the centre with evergreen ferns, *Asparagus* and drooping trails of *Cyanotis* (Wandering Jew), *Cyrtoderia*, *Pilea*, *Pellionia* or *Pothos*: *Lygodium scandens* and *Asparagus Sprengeri* are also useful for this purpose.

There are a few varieties of *Cleus* adopted for basket work, *Rehmannianus* with very small brown and green foliage and full spikes of bright blue flowers and two or three others with trailing stems and large leaves, bronze or deep red and pink

Pot Plants for the Hills. The type of plant grown in cooler stations differs very largely from the plains selection. *Nandina domestica*, *Phyllocactus*, *Ivy Geranium* and *Pelargonium*, *Primula*, *Gloxinia*, *Fuchsia*, *Calceolaria*, *Begonia*, *Ferns*, *Azalia*, *Cineraria*, *Petunia*, *Carnation*, *Cyclamen*, *Streptocarpus*, *Bouvardia*, and *Chrysanthemum*.

The names mentioned will serve as a rough guide but the amateur would be well advised to make a selection after consulting local gardeners.



Acalypha mosarica
(*P. 117, 125*)



Poinsettia cream, pink & scarlet
(*P. 117, 136*)



Poinsettia double.
(*Page 136.*)

CHAPTER THIRTEEN.

GRASS LAWNS.

No garden looks beautiful without a certain amount of grass, it may be that the compound will not allow of a Tennis Court but grass in between annual beds is essential to enhance the effect of the flowers. On the plains and up to an elevation of 3000 feet Doob grass (*Cynodon dactylon*) is the type to use, low growing and hardy, it responds well to the lawn mower. For higher elevations special imported mixtures are advised.

Tennis Courts. Grass does not want any specially prepared soil, provided there is no salt or soda in the ground it will grow anywhere, even on a brick road! Tennis Courts however, want careful preparation and "Tennis Courts in India", issued by the Agri-Horticultural Society of India, will give all the details required. For ordinary purposes Doob grass can be dibbled in after the ground has been dug, cleaned of rubbish, stones, etc, and levelled, and is the most certain method of obtaining a result, do not plant the chopped pieces of grass however at closer intervals than 2'.

How to make a lawn. To prepare the ground for grass, it is always advisable to scrape the surface and sweep away the loose material before digging. If the top spit of soil can be buried 12 or 18 inches so much the better, the trouble from weeds will be reduced to a minimum. Otherwise dig, beat out the clods at once shake out grass and weeds and redig, allow the soil to lie fallow for a week or so and then turn over the soil. This operation should be commenced in the hot weather when the strong rays of the sun can further sterilise the soil and kill dug up jungle. Just before the heavy rains set in roughly level the ground and roll with a heavy roller. Allow the rain to soak the ground and settle the soil when further levelling and rolling can be done. Weed seeds will germinate and can be forked out. When showers hold off, dress the ground, roll and dibble in grass. Light soil and sand should be used to fill hollows as they show up after the grass is growing and this must be sieved on in a dry state not dumped on by the basket load.

It is no use expecting to make much of a Tennis Court or a lawn unless you have in the first place a copious water supply,

hydrant and length of hose sufficient to reach the furthest limits of the Court. If the water pressure is good a revolving spray will be a useful adjunct. A lawn mower and light roller should also be purchased and not merely borrowed when occasion arises.

Regular Annual attention. One good raking a year and a severe cutting with the scythe (jhabow) makes a wonderful difference to the grass. The old stems are removed and new growth can go ahead from the main stem, all surface weeds are also destroyed at one stroke and the surface of the soil can be scarified with a rake and top dressed with sand and manure. This should be done just before the rains break.

Never let the grass get out of hand during the rains, if the lawn mower cannot be used owing to wet weather get grass cutters to keep the grass low, but if grass is continually cut it will cling to the surface of the soil, if allowed to grow it will put out straight stems.

After treatment. Watering. Dew is quite sufficient to keep grass alive in the cool weather but during the dry season a good plan is to water with the hose once a week. It is not advisable however to leave the hose on all night. Grass is a surface feeder and only wants moisture to a depth of 6 inches. The amount of water required depends a good deal on the foundation or lower strata. If cinders or broken brick rubbish is the base on which a lawn has been made, naturally it will be a dry lawn and need constant watering in the dry period. Even in the cold weather a certain amount of water will be necessary.

Manuring. To help along bare patches of grass during the playing season use equal quantities of pure sifted leafmould, sand and Sulphate of ammonia or Nitrate of soda at the rate of 12 ozs. (*i. e.* 4 ozs. each) per square yard once a month.

To obtain a deep green colour in grass, water in Sulphate of ammonia or Nitrate of soda at the rate of a cigarette tin (8 ozs.) to a 2 gallon watering can. This done every month from October to February will be a sufficient tonic for the grass.

The quantity will work out at about 10 lbs. per Tennis Court.

Sand and leafmould should be used to fill hollows, sieved on after a shower of rain which shows up depressions. Do this in reason and

never lay an inch of earth on growing grass and expect it to burrow through immediately.

Annual Top dressing. For the Tennis Court the treatment will have to be more thorough than for an ordinary grass lawn. Just before the rains break first of all rake then work in sand, leafmould, rotted cow or stable manure in equal parts at the rate of one cubic foot to 20 square yards.

A fertiliser which usually contains oil cake, bone meal and Sulphate of ammonia or Nitrate of soda follows in August to tone up the grass for the cold season. This is applied at the rate of 1 cwt. per court and can be laid on mixed into 4 carts sand.

Rolling. Keep your ground level by rolling once a week with a light roller also after weeding ; after the first showers of rain roll thoroughly with a heavy roller, both ways. If the roller is too heavy it is apt to damage the ground rather than help. A regular daily rolling is unnecessary as it is apt to compact soil unless the weight of the roller is about half a hundredweight.

When to weed. Weeding should be carried on right through the year, those types of weed that are most prolific in bearing seed and mature early, being eradicated first. During the hot weather it is a simple matter to cut through the root and allow the sun to do the rest, but in the rains this will not do. Motha in any case must be taken up root and branch. If the ground is heavily covered, use the kodali or khurpi and scrape off the top layer of weed and grass but the scythe or jhabow is also an excellent instrument.

Pests and Diseases. Grass has few pests and diseases to worry it, severe cold and heat will burn the green foliage but returning warmth and a shower of rain bring it back to normal conditions.

The green slime on a lawn is due to bad drainage, drip and too lime and the remedy is to rake in lime at the rate of 2 ozs. per square yard.

A mossy condition of the lawn is due either to a heavy growth of doob grass which has never been raked, or over manured or to the fact that the grass has not been cut low enough with the mower. If cross raking and cutting low does not improve the grass, have the ground scraped (chealed) just before the rains break and rake it deeply.

Fungus on the lawn yields to a couple of doses of Sulphate of iron 4 oz. to 1 gallon of water watered into the raked soil.

For Fairy rings on grass also caused by a fungus, rake the soil and damp the spot with Permanganate of potash, 1 oz. to 5 gallons of water or 4 oz. Sulphate of iron to 1 gallon of water.

Lawn Sand for killing weeds. $\frac{1}{2}$ lb. Sulphate of iron (copperas) and $\frac{1}{2}$ lb. Sulphate of ammonia mixed with 10-15 lbs. sand, broadcast this at the rate of 2-4 ozs. per square yard while a pinch is given for large weeds. This treatment is only suitable for the Hills.

If earthworms are troublesome use a Worm Eradicator. A dilute solution of Phenyle or lime water can be tried and poured in small quantities down each run, but a made up Eradicator is the safest and best.

The best time to apply this is towards the end of the rains. Get your ground moist, spread on the Worm Eradicator and wash it down. If you can arrange to lay the Eradicator just before a shower of rain, Nature will do the work.

Drainage.—Arrange for good drainage in your garden and see that there are several outlets whereby a heavy fall of rain can be quickly taken off the ground. If water lies for any length of time a green or black scum will form near the grass roots which in addition to being unsightly, is apt to damage growth. When the soil shows signs of sourness rake and dust on crushed limestone at the rate of 2 ozs. per square yard.

Always see that there is a slight fall in the land towards a drain, when first making a court.

To aerate soil. To break up the crust that often forms on lawns though constant rolling and leads to bald patches, either use a spiked roller or a wooden rammer (durmuz) with sharp spikes set at intervals of 2" apart. Sandy soil should be brushed in to fill up the hollows and the ground watered. This done twice a year makes a marked difference to heavy courts.

What to weed. Latin or even the vernacular names of weeds will not help much; any plant which is foreign to the lawn is a weed and should be dug out. Do not wait for it to reach a fair size as often a tiny Euphorbia or Evolvulus will give rise to hundreds of seedlings when covering only a couple of square inches of soil.

How to weed. The surface rooting annual type, of which there are quite a few, can be cut just below the crown and removed bodily. Those with a deeper rooting system often have to be pulled by hand in wet weather or dug up but the *bête noir* of the garden is motha, a hydra-headed grass, which is propagated by bulbils. The tiniest one left behind will develop into a legion in a short twelve months. Ulu grass which is a colony type can be removed by digging a foot or so down and beating out the rooting stem not so rarhi (kasia) which is deeper rooted and is seldom totally eradicated.

Grass for the lawns.—Doob from seed is only necessary when there is none of this grass in the locality. The system of chopped doob plastered on with fresh cow manure which prevails in upcountry stations, always adds a certain number of weeds contained in the manure and unnecessary weeding is the result. Grass can be planted at any time of the year provided water is plentifully supplied; the safest period is the early Monsoon, of course, when dibbing or even broadcasting chopped doob is enough.

You will notice that the grass has a tendency in the rains to grow straight upwards and not spread out at first, a cutting with the scythe will alter this trait.

CHAPTER FOURTEEN.

SHRUBS.

Shrubs grown either singly or in a shrubbery should find a place in every garden. Not only do they supply flowers for the table when annuals are not in bloom but provide an effective back ground to the rest of the garden.

The selection can embrace plants that grow in shade or sunshine and this chapter deals with a number of both types.

When to plant. Plants from pots can be transplanted in February so as to obtain the Spring growth but do not take the risk of putting ground lifted shrubs down unless you are prepared to watch your mali, it is safest to plant in the wet weather after the 15th June. If your plants are small, pot them up and carefully nourish them till they able to carry on in the ground.

How to plant. For large growing varieties excavate a pit 3' in diameter and at least 3-4 feet deep, after mixing in half a basket each of leafmould and cow manure, dump the earth back and ram it down. Should the soil be dry, it is a good plan to flood the pit and allow the earth to settle, otherwise there is sure to be a sinkage in the rains. Then redig a foot or so of soil and bury the top portion of the balled roots of the plant just a couple of inches below ground level, stake carefully and place a guard of 3 bamboo stakes or a gabion, if in an exposed position. Smaller growing shrubs should have a pit dug 2' deep and the same in diameter.

Manuring. The planting compost should contain only a small quantity of leafmould and cow manure, but every rainy season give each plant a teaspoonful of fine bone dust which will be found beneficial. If planted in grass land keep the "thala," or space around the stem of the plant, clean by continual weeding and constantly fork up the soil to remove the grass runners underground.

How to prune shrubs. Deciduous types must be most carefully trimmed during the dormant period, the knife or saw being used in January before new growth appears.

Poinsettia should be cut down in March, and if good strong growth is required prune to 6"-9' from the base. By July the shoots would be 4'-5' high when they should be shortened according to

desire. If for a sloping bank, the front line should be lowered to 2' and the back rows reduced by 6". The last pruning must be given by the end of September when just a couple of inches of the tip should be removed.

Lagerstroemia is another shrub that requires drastic pruning, if cut down to 6"-12" from the base in January, the new shoots will grow 6'-7' in six months and flower. If pruned earlier, before the sap is down, growth will commence almost immediately but die back and defeat the reason for pruning.

Other deciduous shrubs such as *Mussaenda*, etc, should be pruned low when dormant. Just a word of warning about the constant application of the knife; *Acalypha*, *Hibiscus* and other plants lose strength when constantly cut back, the old stems get too woody to make good new growth and consequently the plant "ages" and dies. To replace the old stems, gradually cut old branches out from the base, allowing the new stems to take over the strength of the plant before proceeding with the removal of another branch.

Tipping is a mild form of pruning and can be carried out during the growing season to cause bushy growth. In this six inches to a foot of new growth only is removed.

Shrubbery formation, where absolutely necessary. A tall brick wall facing east that is receiving all the south and western sun, a corner on the north or a wall facing north, are some of the situations of the garden where a shrubbery is essential. Avoid planting single shrubs but put in clumps of 3 to 6 and do not arrange in rows but in triangles or wedges or "staggered." Give plenty of space between plants although six shrubs may be started on a plot of ground ultimately to carry just a couple and the extras cut out. Remember the height to which shrubs will grow and keep such as reach a height of 9 to 12 feet absolutely in the back ground.

Pests on shrubs. The shrubbery is generally a neglected area of the garden. When some great disaster takes place we hold up our hands in horror but otherwise we are not concerned with insects. Let us enumerate a few troubles that come to the amateur.

The wooly bug, a powdery insect on *Croton*, *Acalypha*, etc., a scale insect particularly effecting *Hibiscus mutabilis*, the larvae of the tortoise shell beetle on *Argyrea* and a black "snouty" beetle, with a long proboscis with which it pierces *Hibiscus* shoots are some.

Then the borer, a grub of a moth or beetle, eating out the pith of most shrubs though not a serious menace, should not to be overlooked.

Caterpillars of many kinds and colours from the immense green fellow that yields the Deaths-head Moth and feeds on *Clerodendron* and *Alocasia* to the pale green almost invisible creature that metamorphoses into the sulphur butterfly and is fond of the *Cassias* will be discovered among the unwanted inhabitants of the Shrubbery.

Always keep the ground clean in the shrubbery, dead and diseased stems should be pruned, and do not let the growth become too rank. The peeling or cracking of bark or weeping from wounds, usually betokens a fungus at work. Dust lime around the plant and paint the bark with a weak solution of carbolic acid, 1 in 40.

Excreta runs on the bark, or piles of borings advertise the borer in the stem.

Red ants are fond of the tender shoots of some plants, often they are attracted by aphids or some other insect and are hard to shift.

For recipes see Chapter Five on insect pests.

Standards. So many amateurs are anxious to try their hands at making standards that this note has been added. Shrubs such as *Murraya*, *Lantana*, *Hibiscus*, *Ligustrum*, *Leona*, etc. can be quite easily made into standards. Prepare the plant by removing all but a single straight stem and support this with a stout stake. Grow the stem at least 12 inches more than the height at which you wish to have your finished standard, then pinch out the top 3 inches. This will cause laterals to spring out, rub off all those on the stem below say 4' allowing the laterals to spread out 6" beyond the width of the desired bush and then prune these laterals back. Continue shaping the bush by pruning and removing thin twigs and interlaced growth. The standard must always be carefully watched for the least neglect will result in new growth on the stem and ruination of the shape of the standard.

Varieties most useful for cut flowers. Though the shrubbery may be planted for a variety of purposes its chief reason should be to supplement the supply of cut flowers. The best shrubs for this are *Montanoa*, *Tithonia*, *Duranta*, *Leona*, *Clerodendron*, *Tecoma*,

Gardenia, *Lagerstroemia*, *Oleander*, *Plumeria*, *Orthosiphon*, *Caesalpinia*, *Tabernaemontana*, and *Tamarix*.

Berried forms. Owing to the quick eyed bulbul and other greedy birds few ornamental berries are permitted to form on our shrubs. For those who wish to add variety to the shrubbery the following can be suggested.

Ardisia, (*Banjan.*), the *Spear flower* with red berries maturing black and *Breynea rhamnoides*, rather a straggling type with small red berries which also become darker with ripe.

All the *Duranta* bear profusely and their golden yellow berries are very handsome.

Ophioxylon serpentinum is a low growing plant with black berries on a red perianth following the tiny white flowers, *Rauwolfia canescens* has pea shaped berries changing from green to a deep red.

Gymnosporia Rothiana grows tall but can be pruned back, its hard red fruit are like miniature pears and are never touched by birds.

Then the *Rarenia*, which is more or less a weed, has pretty little red berries in sprays and *Deeringia paniculata* (*celosioides*) very similar in colour and size of berries, grows as a semi-scandent shrub and is at its best during December-February.

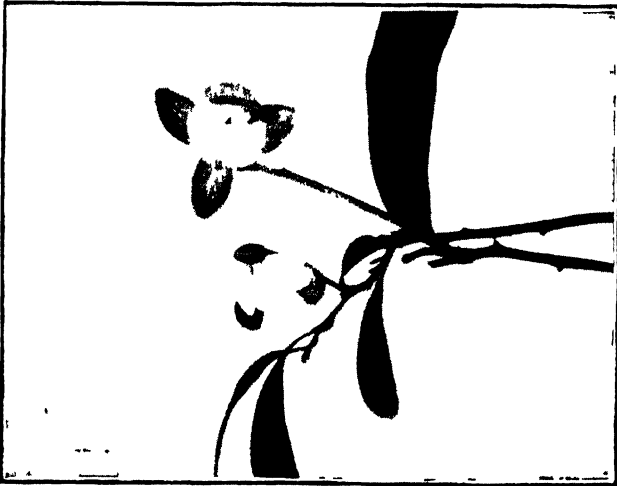
The *Callicarpa azurea*, really a dwarf tree, can be pruned down low, it has small white berries which follow the soft lavender flowers.

Citrus japonica, (*Fortunella margarita*). The *Japanese Kumquat*. There are two varieties of this japanese orange, round and oval, which are grown in large pots or tubs for the ornamental fruit. Restricted root room compels the plant to remain dwarf and bear profusely. A tea spoonful of bone meal should be given every winter and before the rains an ounce of crushed limestone should be dug in, when the fruit sets liquid manure is most useful.

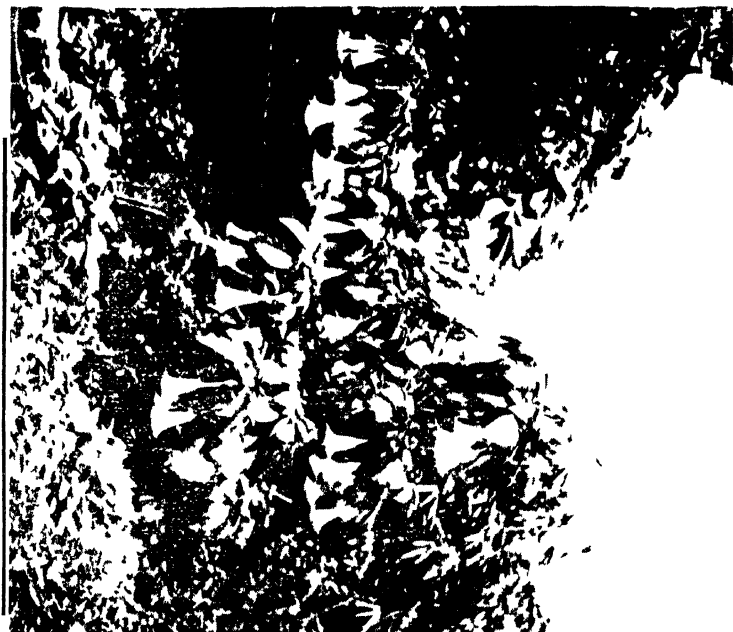
Some of the *Clerodendron*, *inerme*, *indica* and *infortunatum* for instance, are ornamental with red calyx and black seed. *Cestrum alba* has black berries generously produced. Then *Chiococca racemosa* has pale yellow berries while those *Ixoras* that do seed *coccinea*, *venusta* and *hybrida* types, produce berries scarlet, white and in various shades of orange red. *Dracaena* too have sprays of tiny red seed, *Eugenia Michelli* and *zeylanica* red fruit, the orange berried *Murraya*



Montanoa bipennatifida.
(*Pooc 134.*)



Magnolia pumila.
(*Pooc 133.*)



Brugmansia suaveolens
(Page 128.)



Tecoma mollis
(Page 138)

in full bearing is also ornamental, so is *Triphasia trifoliata* with its miniature turpentine flavoured red oranges. *Lea sanguinea* has red seed, *macrophylla* black and all the *Memecylon* bear purple berries. In *Wormia Burbidgi* and *Ochna squarrosa*, the calyx bearing the black seed is red. *Hamelia patens* is another berried shrub with seed a pale red in colour while *Montanoa* with greyish green seed capsules is also ornamental. *Dianella nemorosa* gives the most beautiful berries of any, deep purplish blue which are very distinct and last for a long period but though this is not a shrub, it can be introduced to the shrubbery.

On the plains there is nothing as striking as *Holly*, *Crataegus* or the *Berberis* and perhaps for this reason the berried section is overlooked.

What to grow. Foliage Section. We will consider first those that have ornamental foliage; though the flowering types are very welcome there are certain seasons of the year when none are in bloom and besides foliage is required for shady spots where few flowers will bloom.

The first on our list is the *Acalypha*, all the varieties love the sun but *illustrata* and *Hamiltoniana* do well in semi-shade. But from a collection of twenty-four varieties we must limit our selection to *Wilkesiana* and *bicolor*, tall growing kinds with deep red leaves and *mosaica* of dwarfer growth with slighter paler red contorted foliage. In *Hamiltoniana* the green leaves are edged cream, in *montfortanensis* and *marginata* green edged red while in *illustrata* the green and yellowish green are in irregular blotches.

The *Aralia* which are excellent subjects for shady places, provide among a host of others *Guilfoylei*, green edged cream and *filicifolia* with feathery green foliage which are the most useful.

Citrus limonium variegatum is a Lemon with cream white splashed leaves making a glorious block of pale foliage in the shrubbery.

The *Crotons* form a study in themselves, where ten years back they were very popular and large collections of varieties were the rule at every Exhibition, now only the very hardiest and brightest coloured kinds find favour. A small selection will be quite sufficient for most amateurs.

Among broad leaved types *Reedii*, *Kingianum*, and *Bergmanni* are the best, those with medium sized foliage are *Dayspring*,

Williamsii, *The Czar*, *Queen Victoria*, *Sunset*, and *Beauty*; *Princess of Wales*, *Schomburghianum*, *Indian Prince* and *Sir William McArthur* are some that have long contorted foliage. These are just a few of the many hundreds that are obtainable. Crotons do best in semi-shade.

Coccoloba (Muehlenbeckia) platycarpa is a curious ornamental plant with flattened stems and bamboo like markings.

Such foliage shrubs as *Cyanophyllum magnificum*, *Miconia Hookeriana*, *Sphaerogyne latifolia*, etc., have quite gone out of fashion and can only be seen in a few gardens. They are magnificent foliage plants but difficult to grow.

Dracaena next suggest themselves but we must only use these beautiful plants in semi-shade. Too much sunshine burns the colour and destroys the foliage of the more delicate varieties. There are a large selection but *ferrea*, *Youngii*, *Shepherdii*, *Sanderiana*, *Godseffiana*, *Reginae* and *Jacquinii* are some you should try. *D. fragrans* and *stricta* are deep green hedge types.

Duranta Plumeri variegata furnishes an excellent dot plant for dark shrubberies or a specimen on the lawn. The blue flowers and yellow berries against a background of cream and green foliage makes a very pretty effect, the plant being as hardy as the ordinary green type.

For shady corners and borders the following kinds of *Eranthemum* are worth growing i.e., *albo marginatum*, *variabilis*, *Eldorado*, *discolor*, *tricolor* and *Moorei*.

Eraecaria bicolor, with green leaves having a deep purplish red under-surface, is quite an ornamental plant for semi-shady situations.

Erodia elegans is not seen to any extent now-a-days, the pretty feathery foliage makes it a grand acquisition for indoor decoration or the fernery.

Hoffmannia Ghiesbreghtiana with dull velvety brick red foliage is a very handsome shrub for the fernery and is of easy culture.

Graphytophyllum, somewhat like the *Eranthemum* in general appearance furnishes *hortense* with white and green foliage.

The best *Panae* are *Balfourii*, *Lancasteri* and *Victoria (Bernesiana)* with green and white foliage while among the useful

kinds with green leaves, are *elegans*, *obtusum*, *multifidum* and *Shepherdii*. These delight in semi-shady parts of the garden.

Phyllanthus nirousus and *roseo-striatus* are two excellent foliage plants to add to your collection. The names are descriptive enough the former has snowy white marbling on the new foliage and the latter pink. Both are dwarf hardy shrubs.

Leea macrophylla is a deciduous shrub of coarse appearance 5'-6' high with foliage 30" in length and proportionately broad. The seed is black and ornamental.

If you want a strikingly variegated shrub try *Sambucus nigra variegatus*, the green foliage is broadly margined cream but the plant is rather spreading in growth.

In *Sanchezia nobilis variegata* we have a useful plant standing sun or shade equally well. The green leaves are veined creamy white occasionally tinged red, and while not of very outstanding merit, it is a great factor when a really hardy plant is wanted.

Strobilanthus Dyerianus possesses a shading of colour hard to describe. The new foliage is an iridescent shade of purplish red and with age the leaves get pinkish grey. The plant should be grown in semi-shade and not allowed to get water logged.

Flowering Section. The flowering section is very large and the omissions rather more difficult to make. We want flower all the year round, some varieties are generous and bloom constantly, others last for short periods with a lavish display not to be despised. Let this explanation be an apology for the lengthy list.

Though the majority of *Acalypha* are foliage types *Sanderiana* bears long catkins of scarlet which are very ornamental and borne nearly all the year through. This is an excellent plant for shade.

Achania malvariscus with small half opened scarlet *Hibiscus*-like flowers was formerly a great favorite in gardens but is now superseded by *Leschenaultii* a great improvement in size. These plants flower off and on the whole year round in sun or semi-shade.

Asclepias curassavica, the *Blood flower*, a dwarf growing shrub with orange red and yellow flowers, is a hardy type that delights in dry situations and poor soil and blooms all through the hot weather.

Should *Asystasia coramandeliana* be recommended to the amateur? This shrub is rather a straggling variety that rambles into *Duranta* very delightfully. *A. Travencoreana* is erect with dull purple thimble shaped flowers and loves semi-shade.

In *Atalantia monophylla*, a dwarf tree rather than a shrub, we have an excellent substitute for the Gladstonbury thorn. This plant flowers several times a year and on fairly regular dates. Its white orange blossom-like flowers are very sweet scented and generously produced.

Introduced as a climber *Argyreia campanulata*, soon proved that its scandent growth could be kept within bounds by pruning. By judicious shortening of branches the bush will bear its pale mauve pink *Convolvulus* like flowers every month of the year. It is of easy growth and hardy constitution, gets attacked by the larvae of a tortoise shell beetle which defoliate the plant but cannot kill it.

Azalia are chiefly cultivated on the Hills but in Lower Bengal can be acclimatised and will flower for a season or two. They cannot be recommended for general cultivation however.

A dwarf flowering hedge plant, neat and ornamental for eleven months in the year and a glorious mass of flowers from November to January is the *Barleria*. Known in the vernacular as *Jhate* and commonly called *Tioletta* the original *cristata* type has been hybridised with *bracteata* and greatly improved so that many colour variations can now be obtained. It can be grown unpruned to a height of six feet or cut back to 3 feet and will still flower profusely.

Bankinia acuminata, *Kanchan* or *Kachuar* is a white flowered shrub, 6-8 feet in height nearly always in flower, *Galpinii* from South Africa grows 8 to 12 feet in height and spreads in proportion, and is one of the finest flowering shrubs we have. The bright vermilion red flowers cover the bush from March to September, though somewhat difficult to propagate it is well worth trying to obtain.

The *Angels Trumpet*, *Brugmansia suaveolens*, is a perennial variety of the *Datura* and bears white sweet scented flowers during the hot and rainy season and flowers in semi-shade.

Brunsfelsia are closely allied to *Franciscea*; both *Americana* and *grandiflora* can be recommended to the amateur. These bushes

are nearly always in bloom and bear creamy white sweet scented flowers in full sun or semi-shade.

Buddleia madagascariensis is of scandent growth but can be pruned and kept within bounds; its long tails of orange yellow sweet scented flowers and the silver backed foliage makes it a desirable plant to grow in a large garden. In bloom early March-April. A hybrid variety between the above and the white flowered *asiatica* has creamy white flowers. *Lindleyana*, especially the variety *magnifica*, has lavender flowers but is more delicate.

Two of the *Calliandra* suggest themselves, the dwarf *haematocephala* with scarlet powder puff-like flowers and *Houstoni* with pretty feathery foliage and scarlet tassel flowers. The latter is nearly always in bloom but grows 8-12 feet high.

Camellia are considered too delicate for growing on the plains and certainly the plants do better on the hills. In Lower Bengal however they grow quite well. The soil should be heavy and rich and manured with liquid cow manure every year as the buds appear. A teaspoonful of bone dust in the rains has a wonderful effect on the growth.

Grow the plants on a north aspect in pots 10" to 12" in diameter for preference, and raised on bricks to avoid the earth-worm. Compost $\frac{1}{2}$ stiff clay, $\frac{1}{4}$ old cow manure, $\frac{1}{4}$ coarse sand. Lusty growth will result in no flower buds forming so it is better to starve the plant but still keep it healthy.

The tall growing tree *Cananga odorata* is impossible for a small garden but a dwarf species *nana* gives all the scent necessary from its creamy yellow pendant flowers, this does well in semi-shade.

Among the bush *Cassia* there are just a few one can recommend. All produce yellow flowers, *alata* with candleabra like bunches, *flava* a sulphur shade, *auriculata*, *glauca*, *floribunda* and *tomentosa* deep yellow; *floribunda*, *glauca* and *auriculata*, flower in the hot season, *alata* in the cold weather and *glauca* all the year round.

Cerbera (Kopsia) fruticosa has pretty pale pink Vinca-like flowers and blooms continuously from January to December and should certainly be added to the garden. It grows equally well in sun or shade which makes it invaluable.

Now we come to the *Lady of the Night*, *Cestrum hirsutum* (*nocturnum*) called *Hasu-no-hana*, so heavily scented are its greenish flowers at night as to make it an undesirable plant to grow near a bed room. The coloured varieties of *Cestrum*, *aurantiacum*, *corymbosum* and *elegans* cannot be recommended for gardens on the plains as either free flowering or hardy.

Among the *Clerodendron* we find quite a number of handsome bushes ; of the blue types *serratum* is good but *ugandense* somewhat delicate ; *Kaempferii*, *paniculatum* and *fallax* bear masses of scarlet flowers differing in shade, while the best of the white kinds are *nutans*, *macrosiphon*, *Volkameria*, *fragrans plena* and *inermis*. The *Caryopteris*, *Blue Spirea* as it is commonly called, was once bracketed with *Clerodendron*. *C. mastacanthus* should be grown in large gardens, it has blue flowers and is tall growing. Most of the *Clerodendron* are hot and rainy season flowering types and bloom in semi-shade as well as full sun.

Crossandras in yellow and orange are useful dwarf varieties for the shrubbery or shady corner of the garden. These shrubs are constantly producing bunches of flower till the cold weather sets in.

Some difficulty exists in obtaining dwarf flowering shrubs for shady portions of the garden, *Cyrtanthera magnifica var carnea* and *C. (Belperone) oblongata* come to our rescue. Both are unfortunately a dull pink in colour but flower during the hot and rainy seasons.

There is a great shortage of blue flowered shrubs in Indian gardens, it is a colour extremely rare and any plant that can provide this shade is eagerly sought after. *Daedalacanthus nerrosus* is a hardy evergreen shrub growing 3 to 5 feet in height and during February and March producing spikes of deep blue flowers. A dwarf type *Watti* with a more intense shade of colour is also recommended.

Dombeya possesses a natural disqualification which mitigates against its popularity. The flowers, though generously produced, will not fall after they have faded but hang in ugly bunches till blown off by the wind or rotted by the rain. But for this many of the *Dombeya* would be in general cultivation ; *alba magnifica*, (white) *Lancasteri* and *Gugiana* (pink shades) are but three of the hybrids one can mention in passing. *Natalensis* is a dwarf pink variety. The plants by the way flower in December and January, a season when their beauty is much appreciated,

Though providing an excellent hedging plant we must not overlook the white *Duranta Ellisiae* or the tall blue flowered *macrophylla*, so lovely from March to September.

The *Eranthemum* give us several dwarf flowering shrubs for our shady section, *bicolor* and *grandiflorum*, in white, *igneum* and *laurifolium* in orange red and *laxiflorum* in blue. This last named is quite a new introduction and very fine. The *Eranthemum* have a long flowering period with a short break during the cold season.

Franciscea latifolia (*Hopeana*) bears a violet blue flower which changes to a lavender shade in 24 hours and by the third day is pure white. It is often called by the unscientific name of "Yesterday, To-day and To-morrow" for this reason. It is a slow growing bush which flowers very freely in the early hot weather and gives a few bloom right through the year.

The next shrub is very handsome but of brittle growth and difficult to propagate, *Galphimia nitens* by name, it is constantly in flower bearing tiny yellow blossoms on short spikes.

Gardenias (*Gandraj*) are very well known, *florida* a tall bush is the variety most largely grown, *Fortunei* is dwarf and more suitable for small gardens, both bear white sweet scented flowers in great numbers during the hot months. *gummifera* with its nasty, assafoetida smelling gum and single sweet scented flowers is a type for large gardens.

The *Goldfussia* are useful shrubs as they flower in semi-shade and the varieties with blue and red flowers are both of easy culture.

Hamiltonia suaveolens is a tall shrub with pale lavender blue sweet scented flowers produced in the cold weather. This shrub should be heavily pruned to keep it within bounds.

Hamelia patens provides an admirable subject for a tall boundary hedge, its orange red flowers and reddish berries are ornamental and borne for many months of the year.

When we consider the *Hibiscus* (*Jabu*) we are faced with a section of shrubs that embrace several distinct types. Let us take the *syriacus* section with single and double flowers, chiefly white and shades of mauve borne in the axils of the leaves like the Hollyhock, these grow best on the Hills at fairly great elevations where other *Hibiscus* would not survive but also thrive on the plains.

The *mutabilis* section bloom in the cold months are tall with a distinct coarse leaf and flowers pure white, deep rose pink or white fading to deep pink, both singles and doubles.

Then the *rosa sinensis* type which comprise the yellow, orange and red quadruple forms as well as the well known single drooping scarlet and earing types, the deep pink, terra cotta, cream and red shades.

Lastly the *Alipore hybrids*. These latter introduced in 1907 have thick foliage with flowers, chiefly singles, white, yellow, orange, terra cotta, pink and red.

To give a selection of the best means using botanical or horticultural names by which few amateurs know them but the following are worth growing :—

Doubles. *rubro-plenus* (red), *carneo-plenissimus* (orange), *Calleri* (yellow), *Aurora* (flesh pink), *Juno* (deep pink).

Singles. *rosa-sinensis* (pink), *rosa malabarica* (scarlet), *brilliantissimus* (crimson), *liliflorus* (scarlet).

Hybrids. *King Emperor* (pink), *President* (orange), *Mamie*, (salmon), *Percy Lancaster* (terra cotta), *Ida* (pink), *Margery* (scarlet).

Mutabilis. Double pure white, double pink, single white.

Syriacus. Double mauve and double white.

The *Ixora* (*Rangon*, *Rookmini*) when taken as a whole are the most useful shrub we have. True they are of slow growth but during the hot weather and rains give a return in cut flowers for the table. They grow well in full sunshine though *macrothyrsa* likes a sheltered corner without the western sun. There are a large number of *Ixora*, many pretty shades have been added by hybridisation and the following are the best.

Scarlet. *coccinea magnifica*, *macrothyrsa*, *Duffi hybrid*.

Terra cotta. *Prince of Orange*, *singaporensis*, *amabilis*, *profusa*.

Orange. *Lancasteri*, *Alipurensis*, *aurora*.

Yellow. *venusta*, *coccinea lutea*.

Pink. *rosea*, *ragoosula*.

White. *barbata*, *undulata*.

The Arabian Jasmine, *Jasminum Sambac* varieties (*Bela*), have



Hibiscus Hybrid Type.
(Page 132.)



Hibiscus Rosa-sinensis.
(Page 132.)



Lagerstrœmia indica
(*Page 133.*)



Hibiscus inflatus,
(*Page 132.*)

the sake of the scent. Try these *Khoe*, *Motia* and *Rai-Bel*; *pubescens* has several varieties all known as *Koond*, the winter flowering type is worth growing as well as the variety *rubescens* with pink undersurface to the flower.

Jatropha panduracifolia is also worth growing and while at its best during the hottest period of the year, it bears its scarlet flowers in small numbers all the year round.

Among the *Justicia* the scarlet flowered *coccinea* is the only one that might be grown but there are many other better flowered shrubs for general planting.

Lafoesnia Vandelliana, like a coarse white flowered *Lagerstroemia*, flowers in the cold weather and should be cultivated.

While it is an acknowledged fact that *Lantana* should be given short shift on account of the curse it has become in some parts of India, grow *nivea* (white), *crocea* (yellow) and *camara* (orange red), three of excellent free flowering habit which do not seed profusely. Deprived of seed as they form there is little fear of *Lantana* becoming a nuisance.

One should find a corner for the *Lawsonia (Mendhi)* with its sweet scented flowers, truly called the *Tree Mignonette* for the delicious perfume. Rather tall and straggling in growth, the *Lawsonia* is best planted in the background of a shrubbery where it will, at various times of the year, bear sprays of creamy white or reddish flowers.

Lagerstroemia, the *Crepe Myrtle*, does not look much in the cold season for its bare stems are always difficult to hide unless pruned back. But from the end of April till July and sometimes later, the bushes are laden with sprays of crinkly white, pink or mauve flowers in a variety of shades.

The Bride is a delicate rose, *rosea*, a deep pink, *candida*, dead white and *indica*, pale mauve. These are the best.

It would also be worth trying *Lancasteri*, a hybrid type, with large mauve flowers somewhat like the tree *Jarul* (Pride of India). The bushes are taller growing but far superior to other kinds of the *Lagerstroemia* in flowering propensity.

Magnolia mutabilis, *Jarul Jahuri Champa* (yellow) and *pumila* the white *Jahuri Champa* are shrub types of these well known

plants. The scent of the former is rather overpowering and it is quite tall growing, *pumila* never grows more than 4 feet and is of neat habit.

Malpighia coccifera with its neat dark green foliage and small pinky white flowers is a useful plant for the front of the shrubbery, it will grow 2'-3' and flower in full sunshine or semi-shade at various times of the year. *M. glabra* is rather a tall growing plant with reddish pink flowers.

The next shrub on our list is *Memecylon tinctorium (edule)* with metallic blue sweet scented flowers, rather slow growing but nevertheless an excellent variety to have though it ultimately reaches a height of 8 feet the bush flowers when quite small.

Montanoa bipinnatifida, the *Christmas Daisy*, is a very useful tall growing bush. The foliage, somewhat like that of a Papaya, is ornamental and at the end of December each stem is surmounted by a spray of small white Daisy like flowers which keep in bloom for three weeks to a month and are followed by pretty seed pods which further enhance the beauty of the shrub. This plant is rather impatient of moisture and the hot sun and prefers a slightly sheltered situation.

Murraya exotica the *Chinese Box* or *Kaminu* is an evergreen shrub that forms an excellent hedge, clips well, and when in flower permeates the atmosphere with a delightful bitter-sweet scent several times a year. It will grow equally well in semi-shade or sun.

Now we deal with three shrubs which, while they do not possess flowers of any beauty, are admired for the enlarged leafy sepal acting as a honey guide to the flower. *Mussaenda erythroylla* with brilliant scarlet sepals prefers a situation of semi-shade sheltered from the western sun and well drained, *corymbosa* and *frondosa (Sulapala)* with white sepals are both much hardier, the former is a scandent shrub and should be pruned when deciduous if required to be kept low. *corymbosa* has received the common name of *Dhoby's Tree* or *Paper Chase Tree* in fancied resemblance of the white sepals to kerchiefs or bits of paper.

The *Oleander (Kunel, Kārubi)* next claims our attention; in lower Bengal and where there is heavy rainfall, these plants never flower as well as in the drier parts of India. Of care and attention they require very little and belonging to the class of plant which goats

and cattle do not relish, the Oleander can be grown with immunity in situations where other shrubs would fall victims to the appetite of roaming animals. The single pale pink is hard to beat for quantity of flower, the double pink comes a close second and a deep red single is also fine. But we have single and semi double white and cream as well as several shades of pink and red. Do not prune the Oleander if you want a regular annual supply of flower, the new growth from the base of the plant should produce its first bunch of buds before you attempt to cut out the old stem. The Oleander is tall growing and flowers from early in the hot weather till the end of the rains.

Ochna squarrosa, the *Ramdhan Champa*, with its delicately scented yellow flowers borne on bare stems is an excellent subject for an amateur's garden. The new leaves are ornamental, tinged with red, while the black seed affixed to a scarlet boss further makes *Ochna* a desirable plant. The flowers appear early in the hot weather.

Olea fragrans has a very delightful penetrating scent and should be grown for the sweetness of the small creamy white flowers. The bush likes semi-shade and blooms many times in the year. China Tea is supposed to be scented with *Olea* flowers.

Ocoba spinosa is a tall growing shrub with flowers like a single rose, white relieved with a mass of golden stamens produced in the hot weather. It is hardy but not as free flowering as one would like.

A low growing straggling shrub which repays growing is *Orthosiphon stamineus*, with sprays of whitish lilac flowers borne in great profusion for many months of the year. The shrub grows with very little attention in almost any situation.

Pentas carnea and its white variety *alba*, should be added to every amateur's collection, dwarf growing, constantly in bloom, and revelling in semi-shade it is just the thing for pot culture or the fore ground of a shrubbery.

While *Plumbago capensis* (*Rung chita*) is not as hardy as the white, *zeylanica* (*Shet chita*) its colour is lavender blue and everyone should grow it. Given shelter from the western sun and on a raised plot it will form large bushes even rambling to a height of 6 feet in cool stations. Be careful of pruning *capensis*, old stems and dead wood should be cut out regularly. *rosea* (*Lal chita*) is an under shrub with

sprays of deep red flower, very useful and free flowering. *capensis* is at its best early in the hot weather but gives flower till September, *zeylanica* and *rosea* however, are purely cold season varieties though on occasion flowers are obtained at various seasons of the year.

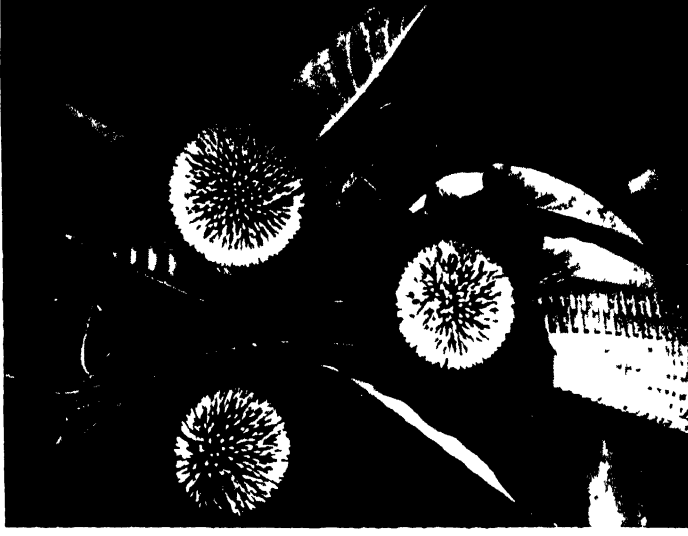
The *Temple flower* or *Frangipani* as the *Plumeria* is called has been represented by a miserable white flowered type for so long that the improved hybrids are liable to be relegated to the background for want of an advertisement. The vernacular name of *Kat*, *Khair* or *Golan Champa* betokens their sweet scent and the majority of the new hybrid types are sweetly perfumed. Out of some 50 varieties *tuberculata*, *magnifica* and *bicolor* white, *lutea* yellow, *rubra* and *Rene* pink, *Lancasteri* pink and white. The *Plumeria* delights in poor soil and a dry atmosphere with full sunshine, flowering at the hottest period of the year. During the cold weather months the plants are absolutely devoid of foliage and this is a great drawback.

Poinciana pulcherrima, now known as *Caesalpinia*, is the well known *Barbadoes Pride*, the red variety is called in the vernacular *Krishna chura* and the yellow *Radha chura*. The foliage is feathery and sprays of flower are constantly produced. When too large for the situation the *Caesalpinia* responds to severe pruning and comes away from the base with strong shoots.

Should we deal with *Poinsettia* as a flowering or foliage shrub? The leaves are actual bractial leaves performing the same function as do the flamboyant petals of the flower. The scarlet *pulcherrima* has a circle of broad gayly coloured leaves, but *plenissima* with a larger number of narrower leaves is the one generally grown. *Alipureuse* is a scarlet sport from *Pink Beauty* and the best of the reds. *albida* has creamy white leaves and *rosea carminata* (*Pink Beauty*) salmony rose, a soft pleasing shade. November to March is the season when the *Poinsettia* is very much in evidence, at higher elevations the period of beauty is prolonged. These shrubs do not like water logging but any soil will suit them and full sunshine must be given. Prune to avoid a tall bent stem and keep the plant at a maximum height of 10 feet.

Polygonum chinense is a shade and swamp loving shrub producing in the cold months sprays of tiny white flowers like *Buck Wheat* and useful for cut flowers.

Punica granatum is the *Pomegranate*, (*Anar*) and the double scarlet *plenissimum* is chiefly grown. The rose-like flowers are



Anthocephalus cadamba.
(*Page 153.*)



Gustavia angusta.
(*Page 159.*)



Cassia nodosa.
(*Page 158.*)

generously produced during the hot months and well into the rains. This tall shrub requires an annual clearing of thin twigs but otherwise is quite simple to grow.

The *Quassia amara* has often been mistaken for a tall bush of *Salvia splendens* on account of the similarity of its flowering sprays but the resemblance ends there. The *Quassia* foliage is handsome, the young leaves being tipped with red, with the best flush of flowers in the hot season but off and on right through the year the bush favours us with a few sprays.

Rondeletia speciosa is very like an orange red *Loera* in growth and flower, useful for cutting and borne for many months of the year chiefly during the hot weather and rains.

The *Ruellia ciliatiflora* called the *Spiris weed* is a low growing tuberous rooted under shrub that can be allowed to "escape" in a shrubbery in full sunshine or semi-shade. Its purplish blue flowers are very pretty in the rains. *Formosa* with red flowers is a bit taller and smaller flowered but grows equally well in sun or shade.

Russelia juucea is the well known *Weeping Mary*, with fine thread like stems and foliage on which numbers of tiny tubular scarlet flowers are produced. The plant is apt to grow untidy and spread unless supported on jaffrey work or grown as a weeping plant over a wall or pillar. *floribunda* with stiff habit is not so ornamental till it comes into bloom during the early hot season when it is a sight worth seeing.

Except that the shrub is rather huge growing *Stemmadenia bella* would be worth recommending to all amateurs. The pure white Allamanda-like flowers smell strongly of thubarb and may not prove desirable from the scent point of view but the generous numbers of bloom makes *Stemmadenia* a highly desirable flowering shrub.

Strobilanthes scaber is a coarse leaved shrub, compact growing and hardy and when in flower during March-April is a pretty sight being laden with yellow thimble shaped blooms. Requires full sun and is useful in a large garden.

Tabernaemontana (*Chandni*, *Tagar*) has been called the scentless *Gardenia* and the double *coronaria* does bear a close resemblance to *Gardenia Fortunei*. There are three single types which are very pretty too, *recurra* being quite dwarf. These plants are very hardy, constantly in bloom, of easy culture and also provide flowers for cutting.

CHAPTER FIFTEEN.

CLIMBERS.

Like everything else in gardening one soon discovers that it is quite easy to make a collection of one class of plant but when selection compels reduction of numbers difficulties arise, as each plant advances a particular reason for being retained.

The term creeper is not synonymous with "climber," the former really referring to such plants as *Cyanotis*, *Pellionia*, etc., which creep but no amount of writing will make amateurs correct this error.

Climbers can be separated into two sections, the heavy which require a tree trunk or strongly built pergola or arch to support them and the light type for which any flimsy jaffrey work or wire netting structure will do.

How to grow. Climbers that are required for a pergola should have the growth more or less at the top, the strongest stems being led upward on string or wire netting strips and the thin twiggy growth cut out.

The varieties for covering a wire screen must be induced to break away from the base and as soon as a new shoot has grown 6 to 12 inches it should be bent at right angles. New points of growth will arise from each node and these shoots, when they reach a foot or so in length, must be again bent horizontally. In this way the screen can be completely covered from the base upwards and need not show a bare three feet before the stems branch.

Pruning. This has been discussed in Chapter Four. Regular cleaning of climbers is a necessity and best done when they are dormant, pruning too must be most carefully carried out. Note well whether the climber flowers on new or old wood before you use the knife.

Manuring. Strong liquid manure is useful when the climber is young while an annual dose of bone meal will strengthen the new growth and result in vigorous shoots and improved bunches of bloom.

Season to plant. What is the rule for planting climbers? February brings in Spring but there is always a certain amount of

risk attached to planting early ; hot winds, shortage of water and the carelessness of the mali have to be considered. Plant as the rains break and be on the safe side.

Soil. Do not use too much leafmould, dig a hole 4' deep and 3' in diameter if possible, mix in a small basket of leafmould with the excavated earth, firm the soil before planting and support the climber immediately.

Pergola. There is a place for everything in the garden and sometimes a pergola will be just right where an arch is out of place.

When making a pergola use brick pillars, if possible with an angle iron core but do not plaster them, point them with cement instead.

Arches. All iron supports should be of substantial material and painted with tar or green paint.

Wood, which gives the most natural effect, is liable to rot and even the most seasoned Teak wood or Sal will collapse in time, especially at the base where the wood remains damp and it is best to tar or apply some anti-white ant paint, Where it is impossible to obtain iron posts, sink an earthenware pipe in the ground and into this bed the base of the wooden upright, previously tarred, with concrete, finishing off the surface smooth with cement to shed water.

Pests and Diseases. Caterpillars and grasshoppers on flower and foliage, the cricket ready to eat through tender growth at the base, grubs in manure, these and a few others have to be guarded against. By removal of dead twigs fungus diseases are avoided, aphids on *Stephanotis* etc. can be dealt with easy enough with *Katakilla*.

Where to grow. Screens. The *Railway Climber* (*Ipomea palmata*) has been used for this purpose from time immemorial and it is difficult to get people to break away. This and *Antigonon* (*Sandwich Island Climber*) which bunches at the top, seem to be great favourites but there are several other better varieties which can be recommended. *Jacquemontia violacea* for instance is excellent and *Passiflora pruinosa* is a good second choice. Try *Vallaris*, *Rhynchospermum* and *Thunbergia fragrans*. Nothing can beat *Ficus stipitata* for a shady screen.

Walls, pedestals, etc. are often too prominent looking and require the softening effect of a climber, for this *Ficus repens*, the *Indian*



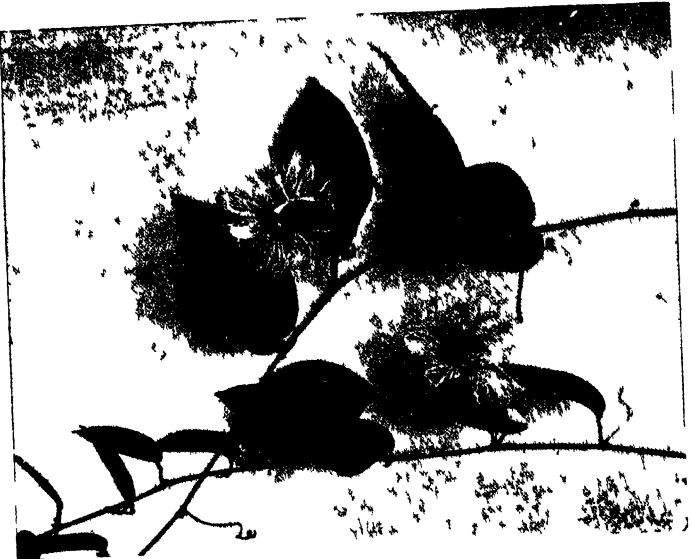
Chonemorpha Griffithii
(Page 146.)



Clerodendron Thomsonii.
(Page 143.)



Gloriosa superba,
(*Page 143.*)



Passiflora pinnata
(*Page 147*)

Ivy is the most suitable, it has smaller foliage than *stipulata*. The wall should be tested before planting as sometimes old plaster comes away from the brick work and spoils many years of growth. No support need be given to *Ficus* as these climbers grip the wall.

Pot culture. Unless grown in large pots or tubs climbers do not flourish for very long, layered plants produce flower in a year or two and if carefully repotted every Monsoon into rich soil will give a good return for sometime.

Bougainvillea Scarlet Queen is an excellent subject for pot work so is *B. glabra* also the *Clerodendron*, *Clematis*, *Clitoria* and most of the light section can be tried.

Shade type. The majority of climbers are flowering varieties which want full sunshine, for shady positions one must fall back on the foliage kinds.

Among the light growing type *Asparagus* comes first, *plumosus* is well known for its finely divided foliage which appears to have been artificially pressed out flat and *racemosus* (*Satanuli*) bearing small white scented flowers during the cold months, *Sprengeri* is used more for hanging baskets than as a climber.

Then come the *Cissus* with heart shaped ornamental foliage, *discolor* being the best of the bunch, there are also *amazonica* and *Linden* but the *Cissus* are deciduous and a mass of bare stems right through the cold weather so plant them carefully. *Dioscorea* too are deciduous, these climbers belong to the Yam family, and *discolor* and *illustrata* have very beautiful coloured leaves.

Annual Climbers deserve mention for they are useful in their own way.

Among the cold weather varieties *Ipomea rubro-coerulea*, the *Heavenly Blue Morning Glory* is a well known type so is *Mina lobata* with yellow and orange red spikes of bloom. We have *Quamoclit* (*Ipomea*) *vulgaris* both white and red, *Ipomea coccinea* scarlet, *Maurandia Barclayana* with pale mauve and *Cobaea scandens* with white or pale mauve bell shaped flowers.

Morning Glory, *Ipomea hederacea* in a great variety of pretty shades must not be forgotten, the Japanese kinds are very handsome and can be sown in the rainy season or cold weather.

Thunbergia alata (*Black eyed Susan*) in white, pale and deep yellow, with and without the dark eye are perennials but often grown as annuals, *Clitoria*, *Aparajita*, the *Mussel Shell Climber* in white, blue and mauve is also a perennial but easily raised from seed annually, the plants flowering in three months. *Gloriosa superba* comes up from a tuber in May and dies down by September and can be bracketed with the annual types. The flowers of this climber are yellow tipped with scarlet.

Deciduous types.—The deciduous varieties are a great source of annoyance in a garden, the *Tecoma* for instance loses its foliage during the cold months and presents a dead appearance. Here an annual climber is an absolute necessity and the only method of covering the bare leafless stems.

The *Clematis paniculata* dies back, *Bignonia venusta* is bare in the cold weather and there are many others too that behave in this unseemly fashion.

Ornamental Section.—The next type of climber to consider is for covering trees, rambling over rockeries, etc. Here *Philodendron* and *Pothos* are unsurpassed, there are quite half a dozen of the former which one could introduce with advantage to a fernery, *Audreanum*, *scandens*, *gloriosum*, *Mamei*, *lacerum* and *nobile* also *Pothos argenteus* with white variegation and *arvensis* with yellow marbling. We have already referred to *Cissus* and *Dioscorea*.

Light Section. *Aristolochia elegans*, *Pakilata*, is our first light climber, its curious pouch shaped flowers are cream mottled chocolate and generously produced during the hot weather. Unlike others of this family the flowers are not offensive.

The *Bignonia* provide many light types and after eradicating half a dozen kinds for not being free flowering enough we come to *incarnata*. This flowers in the early hot weather, its pale mauve flowers are pencilled with a deeper shade and are slightly fragrant. Then follows *purpurea*, the ideal climber for a small garden, evergreen, producing scented flowers six to eight times a year, borne in great profusion and a good clear purple shade in colour. Next *Tweedia* which must be watched, for though one can obtain flowers when the plant is small, it is apt to run wild and climb to the top of a Sissoo or Mangoe forming masses of foliage and yellow flowers in pendant bunches fifty feet above ground level, its self sown seedlings too are an

awful nuisance. *renusta* with orange yellow flowers is well known but has two great faults, first its beauty is short lived and next it is deciduous. The pendant bunches of orange finger like flowers are borne in great profusion in January-February.

Clerodendrons are usually associated with the shrubbery but we have three climbers which are all well worth growing. *Thompsonae* (*Balfourii*) with a white calyx and scarlet flower, *speciosum* with a greenish red calyx and scarlet flower and *splendens* with scarlet flowers. The first named is excellent for semi-shady conditions as well, while *splendens* is one of the best of the free flowering light type yet introduced.

We come next to the *Clematis*. It is a pity that the large flowered *Jackmanni* type are so delicate on the plains. We have to be satisfied with *stammula* and *paniculata*, both with small white star shaped flowers, the former being more highly scented than *paniculata*. The strong new shoots give the best spray of flower.

Gloriosa superba, as its name implies, is a lovely plant, a weed in certain parts of India and not appreciated in gardens, perhaps because it is liable to destruction at the hands or rather the mouth of a voracious black caterpillar. Protect and watch the climber and it will flower from July to September, when you will desire to have a dozen plants instead of one. The innumerable chandelier-like scarlet and yellow flowers are followed by the seeds pods which on ripening split open and resemble the seed vessels of the Gladwin Iris. The Indian name for this climber is *Bishuangul*, *Ees nangul* or *Kariari*.

The *Convolvulus* family are very useful for quick growth and covering an expanse of jaffrey but are untidy, with flowers that last only for a few hours. Everyone knows the *Railway Creeper*, *Ipomea palmata*, and the blue *Morning Glory*, *Ipomea Learii* too but *Jaquemontia violacea* (*Ipomea semperflorens*) is what you should grow. This has blue flowers the size of an eight anna bit which are produced over a long period of the year thus earning for this plant the name of *sempreflorens*. The flowers keep open till the late afternoon and in addition to being light and neat the climber does not "mat" or rush to the top of an arch as quickly as other varieties.

Ipomea Burgessee and *Horsfallae* are rather uncommon deep carmine red varieties of the *Convolvulus* family. Quite hardy when once established and very free flowering.

Jasminums are disappointing. There are quite a number of kinds many producing heavily scented flowers, *grandiflorum*, the *Spanish Jessamine*, (*Chameli*) and *auriculatum* (*Jati*) are the only two which should be tried but under the vernacular names of *Jooce* and *Mullika* there are other scented kinds dear to the Indian.

The *Honeysuckle*, *Lonicera odoratissima*, is not too generous with flowers, a couple of flushes of bloom in the year scented no doubt, does not warrant cultivation. The *Red Honeysuckle*, *sempervirens*, is unscented, an orange yellow in colour and of delicate constitution.

Manettia bicolor is a light twiner which has quite gone out of fashion. Its very pretty scarlet tubular flowers are borne in great numbers. As this climber grows in shade and blooms for a long period during the rainy season it deserves to be more largely cultivated. We need more colour in our ferneries especially on the uncovered posts which often spoil the entire effect of a well filled house.

A place for *Pergularia odoratissima*, the *Cowslip Creeper* or *Laranga lata* should be found in the garden, the flowers themselves are greenish yellow and insignificant but their delightful fragrance scents the entire area. The flowers are produced several times a year.

Solanum Seaforthianum, the *Blue Potatoe Creeper*, and *jasminioides* the white variety, are both pretty and flower right through the hot weather. The former has red berries which add interest to the plant after the flowers fall and until the bulbuls discover the ripe fruit! *jasminioides* does not like damp and is best on the Hills or in upcountry stations.

Everybody wants *Stephanotis floribunda* (*Momlata*) and if you get the right situation the climber is very lavish with flowers which are waxy white, strongly scented and bloom during the hot and wet season. The aphid is a pest that is particularly fond of the *Stephanotis*, on discovery this creature should be syringed off with *Katakilla* or some other insecticide. Grow the *Stephanotis* in a north-east aspect.

Tecomas can hardly be called heavy climbers and must therefore fall into this section, being deciduous, they should always be grown with some other variety which is in leaf during the cold months or

else an annual climber should be used to hide their nakedness. *grandiflora* has immense bunches of pale terra cotta Bignonia-like flowers but is not very quick growing, *radicans* which is rampant, is slow to reach a flowering stage, its bells are a deep reddish shade. *Guilfoylei* a hybrid between these two, is intermediate in colour and the best variety to grow. It will bloom the first year after planting and produce flowering spikes from June till late August. The colour is a pretty apricot terra cotta.

Thunbergia fragrans a light climber with white flowers is useful for semi-shady situations, it is not scented however as the name implies but nearly always in bloom.

Tristelletea australis commonly called the *Star fruit Creeper*, is an ideal light climber with neat foliage and innumerable spikes of small yellow flowers which are nearly always in bloom.

Wistaria chinensis a name to juggle with, flowers in Calcutta, on rare occasions, it should be grown on the Hills and not tried on the plains. The purplish blue pea-shaped flowers are sweetly-scented and are produced in April-May.

Heavy Section. *Adenocalyma calycina* has large yellow Bignonia-like flowers produced in sprays, a single flower at a time but extending over several months from March to June.

Then among the *Allamandas*, *Schottii* (*Pila lata*), is rather a shrubby climber and best grown as a shrub or over low railings. Its yellow blooms are larger than those of *Aubletii* which climbs wildly but flowers very profusely, *purpurea* cannot be honestly recommended, for though the colour is unique, a washed out winey purple, it is neither free flowering nor a strong grower. The hot season finds the *Allamandas* at their best.

The *Antigonon* (*Coralita*), are so generally grown that they need no description. The pure white *alba*, white fading pink *Lancasteri*, and *Apcari* a new shade of carmine red are not so largely cultivated as the common pink *leptopus. insignis*, which has large pink flowers like a small single rose, is rare and delicate. The *Antigonon* flower with short intervals of rest all the year round, and if cut down in March will be in full leaf by June. A second mild pruning can follow in September for a flush of bloom in December.

Artabotrys odoratissima, *Tail grape*, (*Kantali Champa*) appeals to the Indian and its strongly scented greenish yellow claw-like flowers are in great demand, the plant forms a huge bush and is best grown in this way, flowering from March to September.

Banisteria laurifolia, the *Oncidium Climber*, with stiff foliage and large sprays of yellow flower is a very handsome addition to the heavy section of climbers, it blooms in the hot season.

Beaumontia grandiflora, called the *Nepal Trumpet Climber*, is a magnificent variety for a large arch over the main carriage drive or up a *Bombax* (*Semul*) and when these two are in bloom during February, the scarlet and white bells are "a sight for the gods."

There are quite a number of *Bougainvillea* and to discover the best of the red and purple shades we must eliminate those that are very much alike or not free flowering. In the red shades *Scarlet Queen*, now named *Mrs. Bull* by Kew, has floral bracts a deep crimson scarlet in colour and is the best, flowering from November to March and again in June-July. *lateritea*, a dull terra cotta is difficult to propagate, flowers January-March, but the *Maharaja of Mysore*, (a hybrid between *glabra* and *lateritea*), and in colour a terra cotta shaded with purple, is worth growing for the very bountiful supply of flowers it gives from November to May; *glabra* the common pale purple, is welcome because it seems always to be in flower but is of a shade that clashes with most other colours. *Cypheri* is deeper purple with smaller foliage and is coming into favour but flowers for a shorter period. The most intense shade of purple is to be found in *spectabilis* a royal shade which makes one "see black" if stared at too long on a bright day. This variety flowers in a leafless condition during February-March.

Capparis horrida is a thorny climber making a bright show in the hot months with a profusion of white flowers filled with white filaments which fade to a pinky mauve.

Chouemorpha Griffithsii has large Plumeria-like flowers borne in March-June, white with a yellow centre, scented like an over ripe Papaya and is at home up a Palm tree or on a heavy arch.

Congea tomentosa is little known but a delightful climber with soft mauve bracts making the plant a lovely sight during December-March. It can be pruned back to bush form.

Then *Cryptostegia grandiflora*, (*Chabuk Chari*) a pale mauve Convolvulus is very useful in the hot months when so few climbers are in bloom.

Derris scandens, (*Noalata*) is another very heavy climber that requires a strong pergola or tree to support it, the plant is covered with small spikes of white pea shaped flowers borne in great abundance from March to August but must be kept within bounds as the growth is very rampant.

Now we come to that delightful sweet scented climber, *Echites caryophyllata*, *Malatitata* in the vernacular. The flowers are produced from July to September and though heavy growing, the plant can always be kept in check by judicious pruning.

Another climber with sweet scented flowers is *Hiptage mathoblotia*, *Madhari lata*, it blooms in February and resembles the Horse Chestnut with white and yellow flowers on short spikes.

Holmskioldia sanguinea is an untidy straggling shrub which puts on sufficient long growth to be called a shrubby climber. The dull red flower is like an old fashioned candlestick very pretty when produced in large numbers and for this purpose the plant should be grown in full sunshine in a dry spot. In bloom during the winter months and often called the red *Bongainvillea* in error.

Melolinus monogynus, an evergreen with bunches of white vanilla scented flowers produced in March-May is another heavy climber that succeeds better as a bush.

Polygonum Balduanicum is a climber suitable for moist shady situations and better at an elevation than on the plains. The tiny white flowers are produced in great profusion in the early hot weather.

There are a large number of varieties of the *Passion flower*, *Passiflora* (*Jhumkalata*) but they are either short lived on the plains or do not bloom freely enough to warrant inclusion in a small garden. *pruinosa* with ever green foliage and strongly scented purple flowers is the best to grow, *corrulea* with pale blue flowers is pretty but not popular on account of the prolific production of suckers from its roots. Both flower very well. The red *coccinea* is disappointing being very shy in blooming.

Poirrea densiflora and *coccinea* with flat sprays of tiny scarlet star-shaped flowers blooming from March-September, are of good habit and fairly quick growth. The *Combretums* which differ only in the individual flowers not opening out flat, are rather dull coloured with heavier foliage but bloom November-January.

In *Petrea volubilis* we have a lovely shrubby climber so often grown as a bush. The *Purple Wreath*, as it is commonly called by the amateur, bears long spikes of star-shaped purple-blue calyces in which the actual flower of a much deeper shade rests. Unfortunately the spikes cannot be used for cut flowers as they fade quickly and the calyces fall. The leaves are like rough sandpaper and flowers are produced during the hot months and again in August.

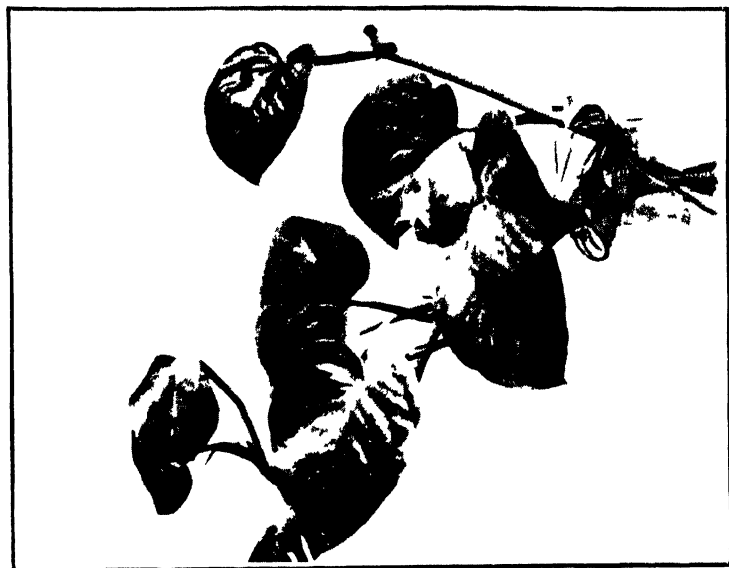
One of the Morning glory family, *Porana paniculata*, furnishes flower in great profusion during December. The heart shaped foliage is a grey green in colour and the tiny funnel shaped scented flowers massed in sprays; the plant looks as if snowed under when in bloom.

Everybody knows the *Rangoon Creeper*, *Quisqualis indica*, (*Huehki*) the bunches of drooping pinky white and red flowers are scented and useful for cutting; they are produced several times a year in great profusion.

Rhynchospermum jasminoides, an evergreen with small white scented flowers is seldom seen in gardens, it is an excellent plant for an arch or wire screen being a hot weather flowering type.

Solanum Wendlandii a very heavy climber, if grown in a compost containing a good proportion of roof rubbish will not suffer from damp of which it is very impatient. The flowers are a pale bluey mauve about the size of an eight anna piece and borne in large sprays from April to August. The foliage though coarse is sparsely produced but the climber requires a good spread of jaffrey to be seen at its best.

Thuuergia grandiflora and a white variety *alba* as well as the narrower leaved *Harrisi* are very heavy climbers and should be grown on very strong supports, even then the knife must be constantly used. The hanging sprays of flowers, blue or white according to the variety, are beautiful and generously produced from March right through the rains.



Pothos aureus.
(*Page 142.*)



Petrea volubilis.
(*Page 148.*)



Tecoma grandiflora
(*Page 145.*)



Bougainvillea glabra.
(*Page 146.*)

The *Apurba* or *Lavender Champa* as the *Uraria odorata* is called, is a great favorite both with Indians and Europeans, its pale yellow sweetly scented flowers are of a milder fragrance than the *Artabotrys* and produced during the wet weather. Try growing this as a bush.

In *Vallaris Hyñei* we have a strong growing screen climber, evergreen and rampant but bearing from February to April small greenish white sweet scented flowers.

CHAPTER SIXTEEN.

TREES.

What varieties of trees can be recommended to an amateur. For instance *Crataeva religiosa* is excellent on occasion, especially when a dry period has prevented production of leaf and the flowers literally cover the tree in March-April. But this is not an annual occurrence. *Courripita guineensis* takes a long while to bloom, grows huge and has the nasty habit of dropping its leaves several times a year yet the flowers are freely produced and sweet scented. Thus have a number of desirable varieties, that might pass muster in a large garden, been omitted.

How to grow. Trees, though hardy, cannot be thrown into the ground anyhow and expected to grow. Dig a pit 4' deep and the same in diameter, mix a small basket of leafmould into the soil and fill in the pit. Flood and allow the earth to sink before planting then dig up a part of the soil and plant, burying the ball of earth, which rounds the roots a couple of inches deeper in the soil, stake firmly and water.

The best time to plant is February if care and attention can be given and regular watering arranged for, but better still plant early in June shortly after the rains have broken.

After care. This is important. To get a straight trunk the tree must be supported from its infancy and only the one main stem retained to carry the head of foliage. The height at which branching should be permitted depends entirely on what you wish to make of the tree. No branches below 8' however should be allowed, grow the single stem 10 feet high then pinch out the tip.

Even *Cassia javanica* and *nolosa* can be compelled to form a straight bole, left on their own they umbrella out, but if from the very commencement branches are thinned out and one tied up to a bamboo, the stem will straighten out.

Pruning must be done carefully, to hack a branch will cause a jagged wound and moisture penetrating the damaged stem will set up rot which may ultimately reach the main trunk. Use a saw and paint the new cut with tar. To repair a hole already existing scrape or chip out all dead wood, wipe the inside with tar

and fill in the hollow with clean khoa and cement, smoothing off the surface with cement plaster. In time the bark will grow round the edges of the cement.

Seed pods as they form should always be removed unless specially wanted. Do not allow grass to grow right up to the trunk while the tree is small, and never brick round or otherwise enclose the base of the trunk.

Trees that have been kept too long in pots should never be planted out. The "wreath" of roots seen at the bottom of the pot is composed of the roots that should have gone straight into the ground. These plants take a tremendous time to start, if they ever do, and then either become stunted or weak stemmed.

Nurse Plants. When ideal conditions prevail the transplanting of trees is quite a simple matter but there are occasions that ask for special consideration. Certain plants are notoriously delicate rooted in their early life, excessive moisture, the hot winds of March-May or some variation of temperature will reduce their resisting power and either kill outright or so weaken the plant that death must ensue. A stake or a dozen stakes may keep the stem from damage, but other steps have to be taken to nurse the delicate baby to health and strength.

For such cases it is suggested to grow a nurse plant such as *Dhaincha*, *Sunn Hemp*, *Boga Medeloa*, *Rahar Dal* or one or other of the Pea family. Three to six seedlings at a distance of a couple of feet from the stem of the plant will provide the necessary windscreen or shade and the moment the tree is large enough to withstand the onslaughts of the four winds of Heaven, these nurse plants can be cut down. A *Siris* which is quick growing often gives necessary support to a more delicate forest tree and is easily cut out when the permanent tree is strong enough. Besides, members of the pea family possess the desirable trait of introducing nitrogen bacteria to improve the soil.

What to grow. Foliage Section. We will run through the list of trees which are most commonly seen in gardens and separate them into foliage and flowering sections giving a brief note about each.

Adenanthera parvina (*Rakta Chandan*) the *Red Sandal wood*, of medium height only warrants cultivation for the brilliant scarlet seeds it bears.

The *Albizia (Siris)* are handsome foliage trees of quick growth, the most ornamental being *Richardsiana* which is a very tall, clean stemmed tree too huge for an amateur's garden if at all on the small size.

Alstonia nereifolia (Chaltm), *The Devils Tree*, is another immense tree of fine shapely growth with deliciously sweet spicy scented flowers which are borne several times a year.

Anogeissus acuminata (Dhao or Dhaura), ultimately becomes very large, it is of ornamental drooping habit and the foliage is tinted red in autumn.

It is doubtful whether *Anthocephalus Cadamba*, the *Kadam*, can be called a foliage tree. It is one of the quickest growing plants, sometimes reaching a height of 18 feet in a single season if planted on light rich soil but after 15-20 years it goes to pieces. For giving a quick screen or shade to a tennis court it is particularly useful. The ball like flowers are sweetly scented.

The *Arucaria, Australian Pines* are very useful, in their small stage they will be found indoors decorating the table or drawing room and look well in the fernery, later they can be planted out in the garden. *Cookei* which has an ideal Xmas Tree shape is the best though *Cunninghami* with coarser foliage is also grown.

Artocarpus Cannoni is one of the few trees that provides coloured foliage in a garden. A good substitute for the Copper Beech, its new leaves are a beautiful reddish bronze and being of dwarf habit is a further recommendation. It can be pruned low and is worth growing.

The *Alexandrian Laurel, Calophyllum inophyllum (Sultana or Punag Champa)* is an evergreen with sweet scented white flowers borne in the hot weather but is rather slow growing.

Casuarina, the *Beef Wood Tree* or *Jhan* is quick growing, has a beauty all its own, but the fallen leaves poison the soil where they lie and effect grass and flowers in a noticeable manner.

One seldom grows the *Toon* in Bengal for though quick growing and carrying a good head of foliage during the cold months which is a great recommendation, *Cedrela toona* has little else to warrant its cultivation. As a quick growing timber tree the *West Indian Cedar* is well known.

Caesalpinia coriaria, the *American Sumach* or *Divi Divi*, requires a little larger garden than the space usually allotted to most city compounds. The "umbrella" habit, light feathery foliage and deliciously scented flowers are all points in favour. Nothing will live in its shade however.

To those seeking an evergreen of dwarf habit and compact head of foliage *Cupania canescens* can be suggested.

Now we come to a class of plant closely associated with the environments of the "dear departed". The sombre beauty of the Cypress, and Juniper are seldom seen in gardens of small size nevertheless they give point to formal gardening. *Cupressus funebris*, *glauca*, *sempervirens*, *compacta*, *Thuja orientalis* (*Arbor viteae*) and *Juniperus Bermudiana* can be named as varieties to cultivate. The vernacular names of *Pata Jhau* and *More Phaukee* will be recognised.

The *Sissoo*, *Dalbergia Sissoo*, is very familiar to all amateurs in the mofussil and being a hardy tree is grown in the drier parts of India where the selection of trees is not great. It is surpassed by *lancoolaria* in Bengal which is of neater habit and dwarfer growth.

Diospyros embryopteris (*Tendook*) one of the Ebony family is an evergreen of medium height with very brilliant red new foliage, the tree is of slow growth.

Eucalyptus are greatly admired. Some have smooth stems off which peel great flakes of dead bark as the hot weather come in, others are rough and unsightly. *citriodora* with lemon scented foliage and *globulus* with blue green leaves, hence the name *Blue Gum*, are two of the best known but there are several others of recent introduction. *globulus* will grow on the Hills and so will the flowering types but *robusta* and *citriodora* can be recommended for cultivation on the plains.

Then we come to the great family of *Ficus*. We see them on every side the *Peepul*, the *Banyan*, the *Pakur* to name a few of the commonest. These are the ones for roadside planting but for the small garden try *Benjamina* and *retusa*. Others of note are *Krishna* with queer cone shaped foliage, *elastica* the Indian Rubber, *pandurata* with large fiddle shaped foliage, *Parcelli* with marbled leaves while in *Roxburghii* called *Ere's Apron*, the leaves are 18" by 20",

All *Ficus* become large with age and should be kept within bounds by pruning.

Filicium decipiens deserves mention for it is little grown except in South India but the evergreen ferny foliage is very handsome and being slow growing is a further recommendation.

Now we come to the *Grerillea* of which *robusta* is the best known representative, it is called the *Australian Silk or Silver Oak* on account of the silvery undersurface to the finely cut leaves. It grows excellently for 6-8 years when pruning is necessary to keep the plant in shape. The small seedlings are ornamental and useful for indoor decoration. When in flower during a April-May the *Grerillea* is very handsome.

In spite of the common look of *Inga dulcis* this tree furnishes a fine thorny hedge when pruned low but grows to huge proportions in time.

I. Saman, the *Rain tree*, like a wide spreading *Siris* with pink flowers is a tree recommended for wide Avenues and Parks. The wood is very tough and seldom do the branches break even in a cyclone while the uprooting of a *Rain Tree* is of rare occurrence. It is also quick growing.

Though the *Persian Lilac*, *Melia azedarach*, (*Bakain*) is a flowering tree the *Neem*, *azedarachta*, is grown more for foliage. The sweet scented flowers and ferny foliage are easily recognised but to the Indian the tonic properties of bark and leaf are of more importance.

Then the *Bokul* or *Mulserai* with dark evergreen foliage and scented flowers followed by orange red berries is an ideal tree for the amateur as it takes years before it becomes unwieldy. Known botanically as *Mimusops Elengi*. The variegated type, *variegata*, has creamy white marbled foliage and is a fine companion plant to *Artocarpus Cannoni*.

Next comes the *Pine* (*Chir, Sarala*) *Pinus longifolia*, which is occasionally found in large gardens on the plains, slow growing but very handsome.

Pongamia glabra (*Delanre*), the *Indian Beech*, though not an evergreen is covered with foliage for a long period. This tree coppices well and can be pruned to form a tall hedge.

The *Debdaru*, *Asoka*, or *Mast tree*, *Polyalthia* (*Gualteria*) *longifolia*. This is a well known tree in Bengal and the U. P. Allowed to grow unchecked it reaches a great height but if topped at 18-20 feet the habit is altered and a dwarfer plant results. The tree can be pruned to hedge form. The weeping variety *pendula*, is also very ornamental. Both are recommended to the amateur.

In *Patranjina Roxburghii*, (*Jalpatri*), the *Lucky Bean Tree*, we have an evergreen surpassing the *Polyalthia*. The general effect of the foliage is that of a weeping tree, though of fairly fast growth it can be tipped and kept within bounds. Another good tree for an amateur's garden.

While referring to weeping foliage let us not forget the *Weeping Willow* (*Mujnu*), *Salix babylonica*, which is best grown at the edge of a tank or an artificial pool and *S. tetrasperma* with silvery under-surface.

Another beautiful tree is *Schleichera trijuga*, *Kusum*, the *Ceylon Oak*. When the new leaves first appear they are a deep carmine red fading gradually to the normal green. An excellent tree for the amateur though of slow growth.

Sterculia alata, (*Buddha's Cocoon*) is a tall foliage tree useful for Avenues and Street planting. The variety *diversifolia*, has been called the *Pugla Tree* as no two leaves are identical in shape.

The true *Mahogany*, *Sreitenia mahogani*, and the *Bastard Mahogany*, *macrophylla*, are both evergreens of large growth, an excellent type for Avenues.

This completes the foliage section and you will see from it that there are really few that can be recommended to the amateur. Among the flowering section, however, quite a few will be discovered worthy of a place.

Flowering Section. The flowering section of trees is much more difficult to "boil down." But here again the selection taken up is fairly large.

Among the *Mimosa Acacia Farnesiana* (*Deb Babul*), the *West Indian Black thorn*, or *Opoponax* is free flowering and dwarf growing with delightfully scented yellow balls of flower. *A. moniliformis*, with

evergreen Eucalyptus-like foliage, can also be recommended for it is often in flower and of medium height. Both these *Acacia* flower several times in the year.

The *Agati grandiflora*, *Bukphul*, *Swamp Pea*, both single and double forms are delightful subjects to grow but hardly good enough for small gardens as their time of beauty is short.

Amherstia nobilis, on the other hand, should be cultivated. This tree does better with slight shade on the south west and is of medium growth. It requires a moist atmosphere, however, and would hardly do in the drier provinces. The flowers appear from January to March and are scarlet and gold in colour.

One is doubtful about *Barringtonia racemosa* (*Samundar ka phul*) or the *Bottle brush Oak*, this has a great profusion of small powder puff like flowers, pinky white in colour. *acutangula* is far superior in growth and size of blossom. These trees love moisture and the corky seed proves a riverine habitat. Flowers early in the hot weather and again in September.

Bauhinia (*Kuchnar*) *Camel's Hoof tree*, offers a large variety of shades. During the early winter months the *triandra* section comes into bloom with narrow petalled sweet scented flowers in white, pink and deep carmine. The type which blooms in a leafless condition in February-March is *variegata* (*variabilis*) in white, pale mauve and deep carmine red. Then *tomentosa*, pale yellow is a dwarf tree and *monandra*, pink, are sometimes seen. The *triandra* and *variabilis* types can be recommended.

The *Indian Cork* or *Tulip tree*, *Mollingtonia hortensis*, (*Bignonia suberosa*) called by the Indians *Akas u u*, though bearing deliciously fragrant flowers in the early hot months and again in October-November is brittle and heavy storms are liable to shatter it. For this reason one should only grow it where falling branches cannot damage anything.

The next on our list is a fairly common Indian Tree, the *Simul* or *Bombax malabarica*. This tree provides the *Silk Cotton* which is largely used for cushions, etc., and when the seed pods burst is apt to cover the garden with drifting floss. Growth is quick but the tree is purely a large garden or Park type. The usual colour of the flowers is deep scarlet but the shades tone down to a deep orange yellow which is quite uncommon. Flowers during January-February.

Brownea does provide a feast of beauty when in bloom and deserves the common name of *West Indian Mountain Rose*; from a seedling the tree reaches a flowering stage in 10-15 years but a graft or layer will take half this time and there are several pretty colour variations. *Ariza* has the largest blooms and *grandiceps* the most unique, both in shades of scarlet. *Brownias* flower from February to June.

The *Palas*, *Dhol-Dhak* is *Butea frondosa*. This ugly large leaved tree is common all over the plains of India and when in flower during February-March deserves the name of *Flame of the Forest*. There is a rare yellow variety but the orange is far prettier. Very slow and hardly worthy of a corner in a small garden.

Callistemon, the *Australian Bottle-Brush*, with its weeping habit and scarlet flowers is worth cultivating as it is in bloom more or less from February to November.

Cananga odorata, the *Ylang Ylang*, be it ever so high will scent the garden many times a year but for all that leave it for a large garden or a Park. The flowers are pale creamy yellow like the *Artabotrys* climber.

We next come to the *Cassias*, these are trees which should certainly be grown by the amateur. *calliantha (multijuga)* is a new introduction, a dwarf tree which gets absolutely covered with golden yellow flowers in September. *fistula*, the *Amaltus* or *Indian Laburnum*, is well known over the length and breadth of India. Though slow growing it is still worth planting and flowers in the early hot weather. *Javanica*, *nolosa* and *renigera* are closely allied in growth and differ in foliage and shade of the pink flowers, *nolosa* is the best as it blooms from March to August. *Javanica* and *renigera* are over by May. Several hybrids are in existence but none can be depended on to reproduce themselves true from seed. *Rosburghii*. If you can obtain a genuine plant of this it is also worth adding to the amateur's collection. Its reddish terra cotta flowers are very beautiful and the flowering period lasts from March to June.

grandis is somewhat like *Rosburghii* while *siamea*, a huge growing yellow spiked variety, is not a very striking beauty but nearly always in bloom. The *Cassias* have many pests, leaf caterpillars, the progeny of the sulphur butterfly are found swarming

shortly after the new foliage appears but the most serious pest is a grub which enters the stem and bores upwards, destroying and weakening branch and trunk. When discovered run a wire up the hole.

Cochlospermum gossypium (*Golgal*) a dwarf yellow flowered tree which blooms in a leafless condition in February is difficult to propagate. This can be highly recommended to the amateur.

Very similar to the *Poinciana* in foliage but bearing long drooping tails of yellow and orange flowers is the *Colvillea racemosa*. This tree is large but not of spreading habit and flowers at the end of the rains.

In *Cordia Sebestena* (*Bhockar*) we have a dwarf flowering tree of ideal habit and continuously in bloom. The orange or deep yellow flowers are borne in bunches nearly all the year round. Grow this certainly if you want colour in your garden.

Among the *Erythrina* (*Parijat*) we have several fine varieties, *crista-galli* dwarf, *Blackii* and even *indica* are worth cultivating for their scarlet flowers.

Gliricidia maculata, what a pleasant sounding name, is the *Madre tree* of South America giving shade to Cocoa but is grown for the generous quantity of bloom it produces. The tree is literally covered with sprays of small pink flowers in February. Of quick growth and yielding to the pruning knife, it should be tried by every amateur.

Gustavia augusta bears the opprobrious name of *Stink wood* and examining the beautiful scented flowers which are like white water lilies should one wander beneath the shade of its Magnolia-like foliage the reason will soon be apparent. The flowers commence early in the hot weather and are produced till July.

In March-May *Holarrhena antidysenterica* comes into bloom. This is called *Kurchi* by the Indians and the bark yields a medicinal ingredient, witness the scarred trunk. Commonly called the *Easter tree* or *Conessi Bark*, its creamy white flowers are borne in grand profusion at a time when flowers are badly wanted.

One usually considers all *Leora* to be shrubs but in *parviflora* we have a dwarf tree bearing dirty white sweet scented flowers in profusion, in March it is well to the fore for a couple of weeks but of no use to the amateur.

Jacaranda mimosaeifolia, while well known in certain parts of India is not in general cultivation, the blue fox-glove like flowers are very handsome while the finely divided foliage makes for an ornamental tree. Recommended to the amateur.

One is often asked about the tree variety of Antigonon and *Kleinhovia hospita* certainly does resemble this well known climber from a distance. The pink flowers in panicles are followed by inflated seed pods which are also ornamental while the tree being of quick and dwarf growth makes it a desirable plant.

Lagerstroemia Flos Regineae (*Jarul*), the *Pride of India*, comes into bloom at the same time as the *Poinciana* and its mauve spikes of flower are very beautiful. *Thorelli*, which blooms later, will last from May to October if the spikes are removed as the flowers fall. This an ideal amateur's tree and highly recommended.

The *Magnolia* must be referred to but what a disappointing plant it is, *grandiflora* (*Him Champa*) is slow growing and though a large plant may produce fifty or more sweetly scented white flowers, their beauty is of short duration. *pteroearpa* (*Anda Champa*) has a coarse scent and the tree itself difficult to propagate. Both flower in the hot weather.

The *Persian Lilac* with drooping bunches of pale lilac flowers is often referred to as a "dream" and the foliage of the tree is also delightful. But for all this allow Parks to grow *Melia azedarach*, it is too large for a small garden. The flowers appear in March-April. If you can get the dwarf *japonica*, try it.

Michelia Champaca, the *Swarna* or *Golden Champa*, is far sweeter smelling than the variety *alba* (*China Champa*) with white flowers. These trees are of medium growth, can be pruned and kept within bounds.

Milletia ovalifolia, is another fine tree for an amateur's collection, of dwarf growth this tree flowers in a deciduous stage in April-May and is covered with small lilac pea-shaped flowers.

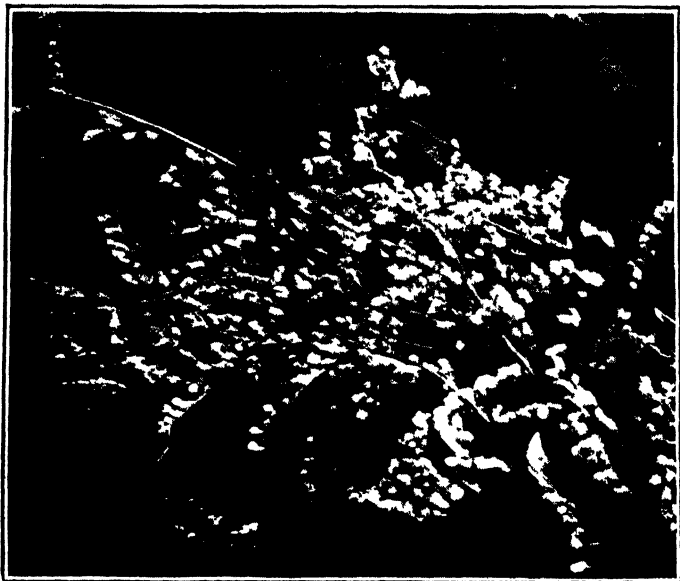
The *Tree of Sorrow*, *Seoli*, *Sephalika* or *Harsinghar* of the Indians is seen more in the mofussil than in Calcutta. *Nyctanthes arbor-tristis*, the Latin name, bears white Jasmine like flowers with orange tubes just before the cold weather comes in, these fall at sunrise and are often collected for dying cloth.



Beaumontia grandiflora.
(*Picee 146.*)



Solanum Wendlandii.
(*Darwin 148.*)



Antigonon leptopus.
17 - 11 - 1



Thunbergia grandiflora.

Peltophorum ferrugineum has been called the *Yellow Gold Mohur* and though similar in foliage, it bears spikes of golden yellow sweet scented flowers. The tree is a quick grower, does not kill grass growing under its shade and can be pruned to suit the situation, for these reasons it is well worth growing in an amateur's garden.

Now comes a tree which is very well known, the *Poinciana regia* wrongly called the *Gold Mohur*. The original Indian name for this tree was *Gul Mohr*, Peacocks tail, but it became anglicised to mean the golden coin. No amount of writing will result in the error being corrected so *Gold Mohur* must this tree be known to the end of the chapter. The *Poinciana* has several faults, it is brittle and cannot be pruned, grass and plants never do well in its shade and being shallow rooted, the tree is easily blown over in storms. Only suitable for Park planting. Flowers scarlet to orange borne in great profusion from March to June.

Our next tree is the true *Gold Mohur* or *Senna* as the *Pterocarpus indicus* is called in Singapore. The *Padank*, which is the Indian name, furnishes a valuable timber but the golden yellow sweet scented flowers borne several times a year make it a tree worth cultivating in a large garden.

Pterospermum acerifolium, *Kanak Champa* or *Muchkunda* becomes too large to warrant it being grown in a small garden. The underface of the large leaves is heavily silvered and the white sweet scented flowers, which are borne in the hot months, are collected for a cooling drink by the Indians. *lanceifolium*, has narrower foliage and smaller flowers and is also dwarfer in growth.

Saraca indica or as it was known years back, *Jonesia Asoka*, is called in the vernacular *Asok*. The dwarf tree bears orange red *Ixora* like flowers on trunk and branches and presents a lovely sight when in full bloom from April to June. Though of slow growth the tree is worth cultivating.

The *Potatoe* family furnishes a fine representative in *Solanum macranthum* with large leaves and bluey mauve flowers. The tree is of dwarf growth but with brittle stems and should be pruned to prevent wind damage. In blooms from March to November.

Spathodia campanula'a, the *Flame* or *Tulip Tree*, forms tall specimens crowned with bunches of scarlet flowers. The wood

is brittle but the tree stands any amount of pruning and can therefore be kept quite low. Too huge for a small garden but try and obtain the variety *nilotica* which is dwarf growing. In flower during the hot months.

We should not omit reference to a couple of *Stereulia colorata* (*Bodela*) with scarlet flowers and *villosa* (*Udal*) with drooping bunches of yellowish brown flowers each with a red eye, *villosa* also presents a remarkable appearance when the claw shaped clusters of fruit mature, become scarlet then split open showing black seed. This variety is worth growing in a small garden.

Thespesia populnea (*Porush*), the *Portia Tree*, claims our attention. The dwarf evergreen habit, profusion of yellow Hibiscus-like flowers and neat growth recommend it for an amateur's garden. Nearly always in bloom too.

The *Thevetia* (*Kalkiphul*) is not so beautiful a tree as to find favour where *Lagerstroemia*, etc., grow well but in the drier parts of India, the three varieties, white, yellow and orange provide scent and shade that are appreciated. Besides, the plants are nearly always in bloom.

This completes the collection of trees and though a large number have been omitted because they are uncommon or of difficult cultivation, there is still quite a variety for the amateur to choose from.

Avenue Trees.—What should one grow for avenues? It all depends. On the Grand Trunk Road the immense spread of *Ficus*, *Peepul* and *Parkur*, *Tamarind*, *Rain tree*, etc., is welcome but for the amateur a smaller evergreen or flowering tree must be chosen. It should be remembered that in time slow growing trees will reach unmanageable heights but for 10-15 years the following can be kept to a reasonable size.

<i>Thespesia populnea</i> .	<i>Lagerstroemia Thorelli</i> .
<i>Mimusops Elenqi</i> .	„ <i>Flos Regineæ</i> .
<i>Polyalthia longifolia</i> .	<i>Milletia ovalifolia</i> .
<i>Putranjiva Roxburghii</i> .	<i>Saraca indica</i> .
<i>Peltophorum ferrugineum</i> .	<i>Filicium decipiens</i> .
<i>Michelia champaca</i> .	<i>Grevillea robusta</i> .
<i>Acacia moniliformis</i> .	<i>Diospyros embryopteris</i> .
<i>Cupania canescens</i>	<i>Pongamia glabra</i> .

CHAPTER SEVENTEEN.

ROSES.

Roses are not a very great success in Lower Bengal, the moisture perhaps is responsible for this and though generous in leaf production the quality and quantity of the flowers is not all one desires.

Roses are roses however, even if the flowers are not 4 inches across or strongly scented.

Soil and Manure. Heavy soil of a clayey nature is the ideal rose compost but this hardy plant will grow in any soil provided of course manure and water is given.

Well rotted stable manure dug in between the bushes during the growing season helps the growth and this manure is specially good for heavy soils, Cow Manure is more suitable for light soils. Then where the ground is low lying and slightly shaded Crushed Limestone should be applied every year to sweeten the soil.

Situation. The Rose wants full sunshine but slight afternoon shade will not hurt it.

Watering. During the dry period Roses must be watered once to twice a week. Special care must be taken as regards waterlogging during the rains.

When to plant. On the Hills plant from March to June and on the Plains from November to February these are safe periods but with care the rose can be bedded out at any time of the year. Roses succumb to damp very readily especially those raised on their own roots or newly grafted plants.

Planting. When the soil is in a workable condition, dig a pit 4 feet deep and arrange drainage if the land is low lying, by filling in a foot or so with broken bricks, clinkers, etc. Do not mix in more than say 10 seers of well rotted cow manure and the same quantity of leaf mould per pit, the manure should not come into direct contact with the roots, these being covered with the finer parts of the soil and leafmould. When planting grafts the union of the stock and rose should be sunk about 2 inches below the surface. Plants

usually reach you with a ball of clay around the roots, do not remove this but gently press it till it cracks in several places, then plant.

Always ram the soil or settle it by flooding before planting so that the bush may not sink after heavy rain.

Roses should be planted 5'-6' apart as this will allow ample space to get around the bush and permit cultivation with the kodali.

Pot Roses. A somewhat richer compost is necessary than is given to ground plants and the use of large 16" pots is imperative. Every third year an entire change of soil should be arranged. Grow only Tea or Hybrid Tea roses in pots, give good drainage and never over-water. When wintering toss the plant out of the pot entire if possible and reduce the ball of earth, then replant; if the soil is too friable just take off the top couple of inches of earth and replace with a rich compost.

Pruning. As a general rule pruning should be commenced from the second year onwards. It is a good plan to thin out only the small interlaced branches in weak plants till well rooted, then prune severely. With the stronger growing types, *i.e.*, H. P, cut down to 18 inches or 2 feet from the ground to obtain bushes 3-4 feet high at flowering time. For Exhibition flowers cut down to 6"-9" leaving 3 to 6 eyes. Always prune to an eye pointing outward. Tea and H. Tea, China and dwarf Polyantha are best left untouched and only dead and weak shoots cut away. Climbing roses are only tipped, after a couple of years the number of shoots may be reduced and the oldest wood removed so as to admit more light and air to those remaining. In the case of the climbing Polyanthas and Wichurianas it is a good plan to cut out all but the strong sucker-like shoots of the previous season's growth. Prune towards the end of October or early in November, though this may be varied slightly either way according to climatic conditions. Pruning throws the strength into the few new shoots that appear and prevents the dissipation of the sap in many weak stems.

Pegging down. Strong growing roses especially Frau K. Druski, Hugh Dickson, King George V, George Dickson, Gruss an Tiplitz, Lady Waterlow, J. B. Clark, Gustave Regis, etc., should be pegged down rather than pruned. New shoots will develop from every node, each of which will carry a flower. Allow strong new



Lagerströmia floerzegnet,
(*Page 160.*)



Solanum macranthum
(*Page 161*)



Holarrhena antidyserterica.
(*Page 159.*)



Amherstia nobilis.
(*Page 157.*)

growth from the base of the plant to carry on as this will provide the stem to be pegged down the following year.

Wintering. Immediately after pruning remove the soil to a depth of 6"-9" and a diameter of 18" from around the roots of the rose and allow the plant to dry for 7 to 10 days according to the size of bush. Then give half a basket of well rotted cow manure per plant and a teaspoonful of bone dust, cover with the excavated soil and water thoroughly. No further moisture should be furnished until the new shoots appear with buds at the tips. A strong dose of well rotted Oil Cake water will be of service now and regular weekly watering can follow. Note Oil Cake should be rotted away from the house as it is very "high" while rotting.

Insect Pests and Diseases. The Rose has many enemies but the few enumerated below are the most common.

Sawflies and *Butterfly* larvae which bore into the stem are only discovered by the powdery deposit excavated by them. Run a wire up the hole if possible, otherwise prune and burn the stems.

Mildew is shewn by whitish blotched foliage and premature leaf fall, for this use a Sulphur spray.

In *Blackspot* the foliage is marked black and *Rust* shows patches of reddish colour on leaf and stem. Treat both these as you would mildew. Badly affected plants must be dug up and burnt.

Orange Rust on roses is unsightly and weakening to the plant and leaves fall prematurely. Burn foliage and spray with Sulphide of potassium. For any rust on the stem paint with Methylated Spirits of wine.

Chlorosis manifests itself in pale yellowish leaves and shrivelled foliage, fork in 1 oz. of finely powdered Sulphate of iron per plant or water this quantity in.

A *leaf cutting Bee* uses circles of foliage as wadding for her nest, and foliage eating caterpillars of several types reduce leaf growth to a small extent. Use a Tobacco spray or Katakilla for these. Often the leaves of the Rose are pierced, bud ruined and flowers damaged without any insect being discovered. This is probably a *Cockchafer* that acts after dark and can only be trapped by lamp light.

The reason for a green centre in roses is due to over feeding or, on the hills, spring frosts. Certain varieties show green centres if underwatered at the time buds are bursting.

Propagation of Roses. Though the amateur may not wish to increase his stock he should know how his roses have been propagated. In most instances roses are budded or grafted on to such stocks as Briar, Edouard or multiflora (miscalled gigantea); during the early period of growth the stock makes a great effort to obtain the ascendancy, often succeeding to the surprise of the unsuspecting amateur who waits long years for flower and gets "nothing but leaves." Strong heavy growth from below the union of the graft should always be treated with suspicion and removed. In wet weather, or when strong growth is induced by manuring, the stock pushes out a strong shoot and by comparing the foliage of the grafted rose with that coming up from below, the difference will soon be discovered.

Roses on their own roots have a longer life and give greater resistance to sharp weather differences. There is no fear of briar suckers and they give a better succession of shoots in summer and autumn but the rose is seldom propagated by layer, cuttings however strike readily on the Hills.

Classes of Roses. Roses are classified under many divisions and by noting the type one can usually steer clear of the pit falls which yawn so wide for the amateur. It is quite impossible to explain the difference in foliage between the various classes without very detailed botanical reference.

H. Ps, *Hybrid Perpetuals*, are heavy growing types, hardy and giving fair sized flowers, many of them scented, but produced in small numbers for the size of the bush. The foliage in most instances is coarse. *Tea*, *Hybrid Tea* and *Tea scented* are usually dwarfier growing, more free flowering, being more or less perpetually in bloom, and the foliage is shiny and smooth.

Roses with *Austrian Briar* and *Pernetiana* blood are too delicate for the plains, some of the loveliest shades of yellow and orange are to be found in this class. *Bourbon* and *China* are treated like the *Tea* class and are recommended for the plains. *Polyantha* and *Wichuriana* are climbers, excellent only for the Hills; for the plains choose climbers from the *H. P.*, *Tea* or *Noisette* sections. The *Hybrid*

Damask represented by *Nurmahal*, *Peace*, etc. are very free flowering types of quite recent origin and the dwarf *Polyantha* are excellent bedding and pot roses.

Standards are roses budded or grafted on to stocks of various kinds and form a bush on a single tall stem of 3 feet ; these can only be grown with difficulty on the moist plains but succeed in the drier parts of India where the stock does not grow strongly. H. Ps. can be made into standards by retaining a single stem, pinching out the head at 3 or 4 feet and then working up a mass of growth at this height.

It is safest to grow the bush type for certain results merely keeping the plant properly thinned out and within bounds if of too rampant a nature.

Selection of Roses.—To recommend the best Roses to suit all amateurs is a task far beyond the power of the writer but the lists given below have been reduced to a reasonable size and will be of help.

For town gardens it is suggested that the selection be limited to :—

Mrs. B. R. Cant,—*Archduke Charles*.

Sombreuil,—*Souvenir de la Malmaison*.

Marie Van Houtte,—*Meteor*.

These six are continually in bloom and very hardy.

In the selections made of Exhibition, Bedding, Utility, Climbing and dwarf *Polyantha*, the chief classes of Roses have been dealt with, scented varieties being marked with an asterisk. Many old favourites have been omitted, some of the newer roses of delicate constitution passed over and as far as possible an amateur's difficulties considered. For those who are more advanced Rosarians the Agri-Horticultural Society's Catalogue should be consulted and a Connoisseur's selection can quite easily be selected.

Many exhibition types are not free flowering, therefore amateurs should rather choose Utility and Bedding varieties where cut flowers are the chief reason for planting roses,

Climbers.

1.	Aimee Vibert.	*	Colour white.
2.	Ards Rambler.		„ orange crimson.
3.	Climbing Paul Lede.	*	„ rose.
4.	Climbing Lady Ashtown.		„ deep pink.
5.	Gloire de Dijon.	*	„ buff.
6.	Celine Forestier.		„ apricot yellow.
7.	Lady Waterlow.		„ pink.
8.	Lamarque.	*	„ lemon.
9.	Madame Driout.		„ deep pink.
10.	Marechal Neil.	*	„ yellow.
11.	Reine Marie Henriette.		„ cherry red.
12.	Waltham Climber.	*	„ crimson.

Dwarf Polyantha.

1.	Alice Amos.		Colour cherry.
2.	Anuchen Muller.		„ pink.
3.	Chattillon Rose.		„ pink.
4.	George Elger.		„ yellow.
5.	Kirsten Poulsen.		„ orange scarlet.
6.	Lady Reading.		„ deep pink.
7.	Madame Jules Gouchault.		„ vermilion.
8.	Resplendence.		„ deep red.
9.	Golden Fairy.		„ white.

Bedding.

1.	Archduke Charles.		Colour red.
2.	Celia.		„ pink.
3.	Charles K. Douglas.		„ scarlet.
4.	Countess of Gosford.		„ salmon.
5.	Cramoisse Superieure.		„ crimson.
6.	Duchess of Westminster.	*	„ rose.
7.	Gruss an Tiplitz.		„ crimson.
8.	Lady Hillingdon.		„ yellow.
9.	Lady Pirie.		„ salmon.
10.	La Tosca.		„ rosy white.
11.	Caroline Testout.		„ pink.
12.	Madame Ferdinand de la Forest.		„ scarlet.
13.	Madame Louis Poncet.	*	„ red.
14.	Marie Van Houfte.		„ yellow.

Bedding — *contd.*

15.	Independence Day.	*	Colour gold.
16.	Miss Willmott.	*	„ lemon.
17.	Mrs. Arthur Coxhead.	*	„ claret.
18.	Mrs. Bryce Allen.	*	„ carmine.
19.	Mrs. B. R. Cant.		„ silvery rose.
20.	Mrs. E. Townsend.		„ fawn.
21.	Mrs. Herbert Stevens.	*	„ white.
22.	Mrs. T. Hillas.		„ yellow.
23.	Red Letter Day.		„ crimson.
24.	Souvenir de la Malmaison.		„ pink.
25.	Sombreuil.		„ white.

Exhibition.

1.	Augustine Guinoisseau.	*	Colour white.
2.	Bessie Chaplin.		„ pink.
3.	Betty.	*	„ yellow.
4.	Caroline D'Arden.		„ pink.
5.	Coronation.		„ pink.
6.	Dean Hole.		„ pink.
7.	Everest.	*	„ white.
8.	Eugene Furst.	*	„ crimson.
9.	Gladys Holland.		„ yellow.
10.	Gloire de C. Guinoisseau.		„ crimson.
11.	Revd. Page Roberts.	*	„ yellow.
12.	Etoile de France.		„ crimson.
13.	Florence Pemberton.		„ white.
14.	Frau K. Druski.		„ white.
15.	George C. Waud.	*	„ vermilion.
16.	George Dickson.	*	„ crimson.
17.	Johnkher J. L. Mock.		„ pink.
18.	John Russell.		„ crimson.
19.	Mabel Drew.		„ cream.
20.	Marcia Stanhope.	*	„ white.
21.	Margaret Dickson Hamill.	*	„ yellow.
22.	Marjorie Bulkiley.	*	„ pink.
23.	Mildred Grant.		„ white.
24.	Mrs. Franklin Dennison.		„ white.
25.	William Shean.		„ pink.

Utility.

1.	Abricote.		Colour apricot.
2.	America.	*	„ pink.
3.	Black Prince.		„ crimson.
4.	Capt. F. S. Harvey Cant.		„ salmon.
5.	Devoniensis.	*	„ cream.
6.	Emotion.	*	„ pink.
7.	Elizabeth Vigneron.	*	„ pink.
8.	Francisca Kruger.		„ peach pink.
9.	Gloire de Ducher.	*	„ crimson.
10.	Harry Kirk.		„ sulphur.
11.	His Majesty.	*	„ vermilion.
12.	Jean Goujon.		„ red.
13.	J. J. Glassford.		„ crimson.
14.	La France.	*	„ pink.
15.	Mrs. Peter Blair	*	„ lemon.
16.	Hugh Dickson.		„ crimson.
17.	The Bride.		„ white.
18.	Madame Ravari.		„ yellow.
19.	Mrs. Hugh Dickson.	*	„ cream.
20.	Monte Christo.	*	„ crimson.
21.	Molly Sharmon Crawford.	*	„ white.
22.	Mrs. Frederick W. Vanderbilt	*	„ orange.
23.	Paul Neyron.		„ pink.
24.	Pierre Notting.	*	„ crimson.
25.	Sir Walter Scott.	*	„ red.

CHAPTER EIGHTEEN.

CHRYSANTHEMUMS.

Raising of Plants. This calls for much careful attention right through the year for though of easy culture in the drier parts of India, we have great difficulty in Lower Bengal to obtain any good results. When the plants have finished blooming in December the main stem should be cut down to ground level and this portion can also be planted for cuttings. Plants raised from cuttings of new shoots from the stool are preferred by many growers as giving larger blooms and throwing up fewer suckers; they also have a better root system and are certainly more dwarf. The Chrysanthemum can also be propagated by layer or gootie. January to March is the season for propagation by cuttings, shoots will appear in numbers right round the pot and from these the new stock must be raised. Keep the pots in full sunshine, some gardeners find they obtain stronger runners by placing the tossed out plant, after cutting off the main stem in the ground, in any case pick out the strongest runners for your next seasons plants.

How to grow. In February the clump is torn or cut apart and each runner with a bit of root attached planted in a cool raised bed to assist thorough rooting. In March the small plants are lifted and balled in clay and again bedded till they have quite recovered. During April-May the Chrysanthemums are transferred to small 4 inch pots and again repotted in June-July to a larger size say 6 to 7 inch, receiving their final transfer in August into 10 inch pots. When repotting always firm the soil around the roots of the newly transferred plants by ramming with a stick. This is important if it is desired to get stocky growth and well shaped flowers. The great point is to dwarf your plant without weakening it by too much starvation till the rains break and then to keep it growing steadily without any check.

A simpler method of growing the Chrysanthemum is often practised which certainly avoids all the potting and attention that this plant calls for. After the plant has finished flowering the stem is cut down to ground level and the pot transferred to full sun, being raised on bricks and given just the ordinary treatment as regards

watering. During the wet weather a top dressing of heavy soil is added but the runners forming the stool remain undisturbed till early August when cuttings are made. These cuttings, when rooted, are potted off into a rich compost and grown hard, being treated as regards disbudding etc., in the usual manner. Exhibition flowers are not so fine but the Decorative are as good.

Soil. When rooting cuttings of *Chrysanthemums* use fresh earth not that made up of tossed out material from pots, add one-third sand and plant the slips 2"-3" apart giving slight shade. The soil should never be too finely screened but contain charcoal or old mortar, breese, etc. The compost, till the final potting, must be ordinary garden soil of a sandy nature to which a third leaf mould and the same amount of lime rubbish has been added also a teaspoonful of bone meal. But the last (August) mixture should contain at least one third each old cow or stable manure, leaf mould and garden earth while a teaspoonful of bone meal per 10" pot will be of great help. Lime also plays a great part in keeping the soil sweet and giving strength to the stem.

Attention during growing Season. During the rains keep the plants raised well above the ground either on bricks or if possible on a south verandah or the roof of the servant's godown; to reduce risk of damping off, pile the earth round the stem higher than the rim to act as a watershed. Should your plants grow too rapidly and be 12 inches high by July, they should be cut back to half their height. Stake the *Chrysanthemum* firmly when it is repotted in May, remove all runners and side shoots except where a bush type is being prepared. August and September weather causes most damage to the *Chrysanthemum* in Bengal owing to a saturated atmosphere so be extra careful during these months. The plants should be sheltered from the afternoon sun and kept out of strong winds.

Where *Chrysanthemums* are shaded from overhead rainfall by hooghah mats, give every bit of sunshine between showers.

Never let the *Chrysanthemum* become bone dry nor water-logged nor pot bound. If you can guard against these three extremes you are fairly safe. Use filtered tap, well or tank water and avoid unfiltered water during March-June when it is liable to be brackish.



Cochlospermum gossypium.
(*Page 159.*)



Chateva religiosa.
(*Page 151.*)

Sterculia villosa.



Japanese Chrysanthemums.



Forms. Chrysanthemums can be grown in bush form or on a single stem. To obtain the bush type, the tip of the main shoot should be pinched back at a height of three or four inches, this will cause branching and each subsequent stem, when it is a couple of inches high, should be similarly treated till August. The Cineraria flowered are grown in this fashion.

If the single stemmed Chrysanthemum does not meet with favour and yet large flowers are wanted, cut back the original stem when 6 inches high and retain 3 of the shoots that break, treating each as a single stem. Grow no more than three flowers on each stem. Exhibition types should be grown on a single stem while Decorative look best when producing half a dozen or more blooms.

Disbudding. There is no hard and fast rule about disbudding the Chrysanthemum. It is usual to calculate from the time a bud shows colour till it is fully blown as one month and from the time a bud first appears on the plant till it reaches a flowering size as between $2\frac{1}{2}$ to 3 months.

If every bud produced by a Chrysanthemum was retained the flowers would be very small indeed, by removing all but a single bud an immense 6 to 9 inch bloom is the result, provided of course you have the large flowered variety. It is preferable however to leave a spray of six to a dozen flowers per plant instead of a single gross bloom.

Experience alone will teach you about the taking of buds. It does not really matter except where exhibitions are held and certain dates have to be kept. Besides all varieties do not open their flowers at the same time while the condition of a plant has also to be taken into consideration.

It is safest in the long run to remove one-third of the buds that form on a bush, this will give a good number of medium sized blooms. Remember that Chrysanthemums do not like to be dried off too much, buds will harden up permanently or when they open produce few florets on large fat buds if this happens too frequently.

The first crown bud is usually kept for single and semi-double varieties but the next, called the 2nd crown, really furnishes the larger flower. You will notice after pinching out the first (crown) bud that a cluster of buds will develop from the next node, the terminal bud

alone should be spared the other two rubbed off as soon as possible, also any others that may appear lower down the stem. To throw strength into the flower all runners should be cut off and no shoots allowed to develop on the main stem. Remove buds that form before the end of August as these usually develop into poor flowers.

Deformed buds are often due to insect attack but there are one or two varieties of Chrysanthemum much given to fasciation. On first noticing the flattening of the stem, that portion should be cut off and from the shoot then appearing a good flower will be borne late in the season.

Manuring. The Chrysanthemum is a surface rooting plant and care should be taken not to disturb and damage the delicate rootlets which absorb nutriment by too frequent forking of the soil.

Little liquid manure should be given to a plant till the buds are swelling as otherwise the foliage will benefit to the detriment of the flower. If however the plants are very poor in appearance a weak dose of $\frac{1}{4}$ oz. Sulphate of ammonia to a gallon of water will act as a tonic, this may be given once a week.

As the buds reach the size of a pea commence watering with liquid manure, Cow manure, Guano or rotted Oil Cake water are all good. When using chemical manures give $\frac{1}{4}$ oz. per gallon. First damp the soil before using liquid manure. During August and September feed the plants carefully.

When applying liquid manure give clean water in the intervals between two applications for the absorbing system of the root is liable to get clogged with too much nourishing material of a heavy nature. Fresh water flushes out the excess manure and also prevents souring of the soil. Overfeeding causes distortion of bloom.

In September use the following liquid chemical manure, Sulphate of ammonia $\frac{1}{4}$ oz., Nitrate of potash $\frac{1}{3}$ oz. and Superphosphate 1 oz. to 2 gallons of water a given in two applications at an interval of a fortnight.

Flower Period. When the flowers reach a half open stage transfer the plants to an aspect where the opening bloom is sheltered from the western sun and yet can receive the dew and morning

light. Do not wet the petals of the flower but syringe the foliage. Discontinue liquid manure as the flower opens giving only copious draughts of pure water. When the flower is fully blown transfer the plant under cover and it will last better than if out in the open.

Cut off all decayed petals as they show and dust on sulphur to stop rot should this set in. If the bud appears to be "bound" and fails to open, split the scaly sepals of the flower carefully.

Insect pests.—The Chrysanthemum is destroyed by the grub of a *cockchafer* introduced in half rotted cow manure, as the grub works underground and is only discovered when the plant fades, a recipe is of little help but if there is any suspicion of a grub use a lime water solution. The *green fly* (*aphis*) crowds the tips of the 'Mum sometimes early in the year but more often as the buds form, this pest can be got rid of by dusting with Tobacco powder or spraying with Katakilla or other insecticide such as Tobacco water or Kerosene emulsion. For Chrysanthemum *Rusl* use $\frac{1}{4}$ oz. Sulphide of potassium to a gallon of water sprayed on once a week.

Black spot means too much moisture and a sour soil due to overfeeding and a heavy fertiliser. Lime should be dug in to try and save the situation.

Points worth remembering to ensure success.

1. Select the right kinds.
2. Root them correctly.
3. Pot them in correct compost.
4. Stake the plants from the very commencement.
5. Remove suckers and side shoots and all extra growth that will not flower.
6. Feed the plants properly.
7. Never let the soil become bone dry.
8. Stop the shoots at the right time
9. Keep the plants free from pests and mildew.
10. Shade the flowers as they open.

What to grow.—Why be satisfied with a third rate article when a superior type can be obtained? There are a number of Chrysanthemums whose names have been lost in oblivion and

degeneration has so altered them that no one would dare to guess the name. Pride of Madford for instance is in great demand because of its luxuriant foliage and hardy constitution but the flower is a dull washed out mauve. The following varieties are recommended :—

Exhibition varieties.

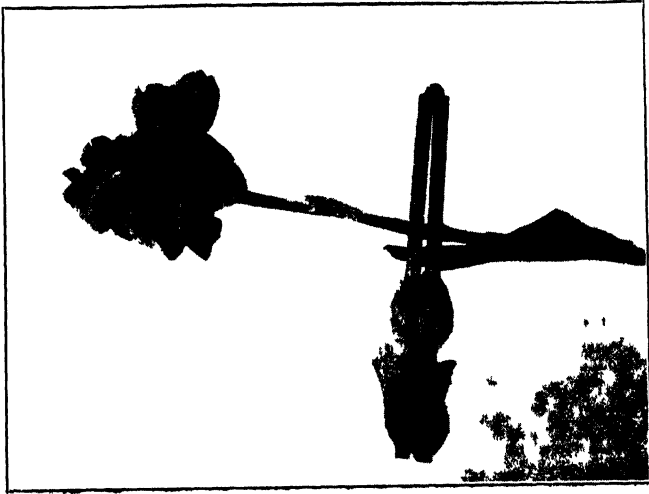
1. William Turner	Colour white.
2. Louisa Pockett	„ white.
3. B. Stockart.	„ cream.
4. J. S. Lloyd	„ primrose.
5. Mrs. W. Saunders.	„ light yellow.
6. General Hutton.	„ deep yellow.
7. Golden Champion	„ golden yellow and bronze.
8. Edith Cavell.	„ light chestnut.
9. E. N. Ward.	„ orange bronze.
10. Thomas Pockett	„ pink.
11. Anadi Nath.	„ heliotrope.
12. Mrs. W. A. Reid.	„ intense crimson scarlet.

Decorative varieties.

1. Blanche de Poitou.	Colour white.
2. Candida.	„ white.
3. Mrs. Maud Jefferies.	„ white.
4. Mrs. Roger Thompson.	„ deep yellow.
5. Mrs. H. Gubbey.	„ pink.
6. R. C. Pulling.	„ light bronze.
7. Kara Dow.	„ golden bronze.
8. Goliath.	„ reddish crimson and yellow.
9. Mrs. R. Luxford.	„ Indian red.
10. John Reid.	„ wine red.
11. Gertrude Peers.	„ crimson.
12. Leigh Park Wonder,	„ deep crimson.

Cineraria flowered.

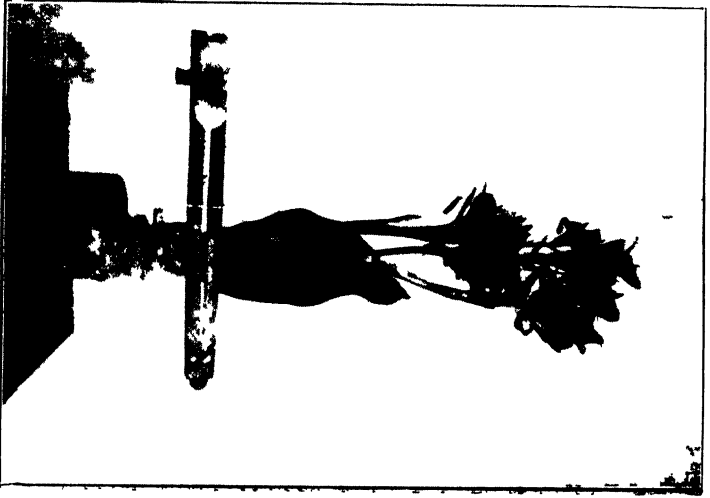
1.	Ruth Wakeling.	Colour	white.
2.	Mrs. Filkins.	„	primrose.
3.	Charm.	„	blush.
4.	Dairy Maid.	„	light pink.
5.	Multiflora.	„	deep pink.
6.	Golden Shower.	„	orange yellow.
7.	Juliet.	„	purplish pink.
8.	Pilgrim.	„	chestnut red.
9.	Jessie Sergeant.	„	pale purple.
10.	Royal Queen.	„	deep purple.
11.	Pagan.	„	erimson.
12.	Black Prince.	„	deep crimson.



Canna Dreadnaught Type
(*Page 179.*)



Canna Candleabra Type
(*Page 180*)



Canna Minutae and
single flower, Crozy Type.
(Page 179.)



Amomum vitellinum.
(Page 189.)

CHAPTER NINETEEN.

CANNA.

The Society has specialised in Canna for many years now and commencing in the year 1890 when the first hybrids were raised, new kinds have been regularly added. Great strides have been made in cross-breeding experiments during the past few years which have resulted in several distinct types being introduced. Every year between 3000-4000 hybrid seedlings are grown by the Agri-Horticultural Society and the majority of these are rejected, only the improved varieties in size and colour being retained.

This is no place to dilate on the gradual advance of the Canna from the original *indica*, through *Annei* hybrids to the *Crozy* type which in 1900 measured 3 inches across with a petal width of $1\frac{1}{2}$ inches. The *Dreadnaught* type which has since been introduced contains some varieties with flowers 6"-7" across and a petal width of $2\frac{1}{2}$ inches.

By common consent we propagate a serious error in calling the floral envelopes of the Canna "petals". The real "petals" are the three quilled pale yellow or red coverings of the bud, and the flamboyant "petals" are really petaloid stamens. Only one carries an anther now, three have been metamorphosed into petals, one into a lip and another into the standard which carries the anther. The scimitar pistil alone is an original organ.

The shades of colour cover a wide range from all but a white through yellow, orange, pink, to an intense maroon red; there is no blue as sometimes advertised by fraudulent nurserymen.

Raising Canna from seed is a tedious business, it is seldom that one can obtain an improved type unless careful cross-breeding has been practised and a large number of seedlings grown.

Types of Canna. Year of introduction given in brackets.

Minature. (1926)—This is a small flowered Canna derived by crossing the Society's Hybrid strain with pure *Canna indica*. The type aims at providing a neat, small-flowered, compact spike which can be used for table decoration for which the present heavy headed varieties are unsuitable.

Dreadnaught. (1904)—A great advance on the ordinary *Crozy* or *Gladiolus* flowered Canna. The individual flowers are immense and bunches gigantic. As cut flowers they require large vases and bowls.

Alipur Hybrids. (1892)—The selection offered is the result of 37 years of hybridising. The great range of shades makes it quite impossible for a complete list to be given, many of the seedlings are selfs, others splashed, striped, spotted or with borders of paler and darker shade. These are an improved *Crozy* type.

Candleabra. (1926)—Here we have a distinct break in the Society's hybrids. The main flower spike branches as some other hybrids do, but instead of giving two or three side issues, as many as 6 to 12 spikes are produced.

Dwarf. (1911)—This is a *Canna* which does not exceed a height of two feet at any time of the year. *Cannas* can be starved to remain dwarf but will rush ahead when manured and watered. This type will not "bolt".

Bouquet. (1924)—In this *Canna* we have an ideal bedding variety with flowers on closely massed spikes so as to represent a bouquet of flowers. At present the bouquet type is amalgamated with the Dwarf.

Giant or Orchid Flowered. Originated in Italy in 1893 and for many years were great favourites. The large blooms of silky texture are too delicate to stand heat and wind and resemble the flag *Iris* in general appearance. Besides this, never more than two flowers open at one time. Hybrids with the *Crozy* type failed to give body to the flower or increase the number of flowers and for this reason this type of *Canna* has been discarded.

When to grow. Obtain roots from the Agri-Horticultural Society in June but book an order earlier in the year in case stock is sold out.

This is the best season of the year at which *Canna* can be attended to though the roots can be planted at any period quite safely. With June planting the full benefit of the monsoon is received and a strong clump prepared for the cold weather season, for a single root planted now, forms a bunch of stems by the end of the rains.

How to grow. In June dig up the entire clump, remove to a cool spot and attend to the bed as advised below.

Prepare the soil by digging at least 2' deep and beat out the clods, mix in fresh stable manure, without the straw if procurable, otherwise rotted manure will do at the rate of one cart of 20 cubic feet to a bed of 60 sq. feet. Incorporate the manure thoroughly with the soil,

Then split the clump and plant only the strongest roots, rejecting the shriveled inner pieces. Cut the stem down to within 6 inches of the root before planting.

Plant the rhizomes only an inch below the surface of the soil, the stem ensuring the growing point being uppermost, flood the bed and shade the bulb itself for a few days with mats, leaves or straw, should there be hot sun. Within 6 weeks the Canna should be showing its first flower spike and other stems will follow in quick succession, giving a fair sized clump by September. Plant 2½'-3' apart and "staggered" rather than in regular rows. To keep Canna neat the mali should make a daily tour of the beds and as the flowers fade pull them off and when the spike produces its last bloom cut it down to the base. It is not necessary to remove the foliage unless heavy manure has been applied. In this case some of the stems should be cut out.

The soil should be frequently stirred in dry weather but no further manure will be required till November when a top dressing of stable manure will be acceptable.

As soon as the soil has thoroughly dried off, after the rains, fork it up and flood heavily, then allow the soil to dry a couple of days, lightly cultivate the top inch or two as this will allow moisture to be retained for a longer period than otherwise. Every month or 6 weeks further digging and watering will be necessary. A mulch of manure given early in November and another in January will help the Canna tremendously. In the hot months flood oftener but give no more manure.

Height in Canna does not mean a bad type, possibly the soil is too heavily manured and rainfall, such as we have in lower Bengal, has forced growth to the detriment of the flowers. The greatest mistakes that can be made with Canna cultivation are first, neglect of the annual replanting and second, the constant daily watering which only wets the surface soil.

Never let a seed pod set on your Canna, as the flowers finish cut off the stem from the base or, if you know the knack, break the stem just above the root with a sharp downward jerk.

Pot culture.—The Canna requires 12"-14" pots or Kerosene oil tins to give any results while the compost must be composed of



Polianthes tuberosa single and The Pearl.
(*Page 194.*)



Hemerocallis flava flore-pleno.
(*Page 191.*)



Homantius Kalbreveri



Hedychium coronarium flavum.

CHAPTER TWENTY.

BULBS.

The cultivation of lilies is not practised by the amateur to any great extent. A few *Amaryllis*, *Haemanthus* and sometimes a *Crinum* or *Pancratium* will be the entire selection found in even advanced collections. While acknowledging that the variety in Bengal is limited to a few kinds that provide flowers at various times of the year, in pots or the ground, there is no reason why a larger selection cannot be grown.

The word Bulb in this chapter embraces all sections of plants bearing tubers, rhizomes, etc., but really Bulbs are modified leaves folded round each other, for instance *Lilium* or *Amaryllis*; a corm is a solid tuber from which offsets arise as in the *Gladiolus*. A tuber on the other hand is a thickened rhizome or stem, Arrowroot is a good example. A *Dahlia* is not a tuber for the root itself will never grow a plant unless a portion of the stem is attached to it.

Soil. For pot plants the compost should be half garden soil on the sandy side and a quarter each leafmould and old cow manure, with a handful of wood ashes per pot. Re-pot every year according to the season of flowering, a safe period being the commencement of the rains for those that are not deciduous or in flower.

Manure. In the ground dig in cow or horse manure a handful per bulb as growth commences, say February-March, and when the flower buds show give liquid manure every week.

Manure in liquid form can be supplied from the time the flower spike shows up till the bud expands, thereafter clear water being given. Bulbs must have a resting period and as soon as the leaves commence to wither or are produced in small numbers, water should be gradually withheld. Never use a chemical manure but Oil Cake, Guano etc.

Planting.—Most low elevation bulbs, *Amaryllis*, *Haemanthus*, etc., should be buried so as to leave just the tip showing above the soil. *Gladiolus* should be 2" below ground, *Lilium longiflorum* at least the same depth.

The feeding roots come from the base of the bulb and care should be taken that these grow in a light compost, a little sand sprinkled on the rich soil on which the bulb rests will greatly assist the formation of new roots. Stake the bulb as soon as the growth is 6" high and do not over water, for once the soil gets sour the bulb is certain to fail. Gladiolii too get blown over when the leaves catch the wind if not staked securely.

On the Hills plant Hyacinths, Tulips and large bulbs 3'-4" deep in fact make a general rule of planting a bulb its own depth below ground; where frosts are liable to damage bulbs, bury them twice their depth.

Certain lilies throw out roots above the bulb in addition to those formed at the base and these in consequence must be buried 4" to 6" deep. *Lilium auratum*, *speciosum*, *tigrinum*, *Brownei* etc., are examples of this type.

When planting bulbs in fibre, use small pieces of charcoal mixed with half rotted leaves as this will ensure better root formation. Always moisten the fibre first then fill the bowl. Keep the fibre just moist never fill the bowl with water.

Bulbs should form roots before the flower is allowed to form. If forced a flower spike may be produced but will be both poor in appearance and re-act detrimentally on the bulb.

To obtain a longer flowering period the anthers or the pollen sacs should be removed from the flower before they burst. It will be noticed that if pollen reaches the stigma, fading of the floral envelope will commence almost immediately.

Storing. The amateur loses bulbs very largely during the dormant period because his storing arrangements are bad or method of treatment wrong.

When the bulb commences to mature do not cut off the foliage but reduce the water supply and let it gradually lose its leaves. These may fall off naturally as in *Haemanthus*, *Gladiolii*, etc.; or have to be cut off but they must be absolutely dry when removed. Toss the bulb out of the pot or dig it out of the ground and let it lie in a dry shady place for a few days till any excessive moisture has evaporated. Dahlias are often dug up after the stem has been cut off and immediately popped into sand with the result that the bulbs rot. Remove

all loose scales, earth, etc. and store in dry sand or fine screened earth which has been sterilised by exposure to sun or fire. Sawdust or coir dust if sterilised is also good material. Never store in hot material, let it cool, place a layer of an inch or so in a wooden box, arrange the bulbs so that they do not touch each other and pour in the material around them covering them by an inch or two. But turn the crown of the bulb downwards in all cases. Close down the box and keep it in a dark cool room, an upper storied building if possible and certainly 6 to 8 feet off the ground. Examine the bulbs from time to time in case any rot and spread infection. A note should be made as to when the bulbs are required, remove them a day before and let them lie in the dew overnight before planting. Damp the potting soil and shade the pots for a few days. Watering at this period should be reduced to a minimum.

Where to grow. *The Border.* A large selection of bulbs such as *Crinum*, *Paneratium*, *Hemerocallis*, etc. finds a home in the permanent border. It is not always possible to replant these every year but if a small quantity of rich organic manure is forked into the soil the bulbs will be helped considerably. These do not require to be wintered. Remember where deciduous bulbs were planted for the mali will cut through any bulb on his cleaning jaunt, unless the spot is definitely marked.

Grass land. *Zephyranthes*, *Amaryllis*, *Cipura* and *Cooperanthes* are four varieties which thrive in grass. To plant these bulbs gouge out holes irregularly, not in lines, 9"-12" deep and 3" in diameter. Fill in good soil and plant bulbs, offsets will soon make a patch and self sown seedlings form a colony.

Pots. For pot cultivation *Amaryllis*, *Lilium*, *Haemanthus*, *Eucharis*, *Freesia*, etc., can be tried. The larger bulbs require ten inch pots but 7 to 8 inch is quite large enough for the *Amaryllis*. Kerosene tins are often called into requisition for *Canna*, *Gladiolii*, *Paneratium*, *Crinum*, etc.

Propagation. *When to divide.* Some bulbs form clumps by offsets, etc. and it is a good plan to replant those varieties that are not dormant at all, such as *Paneratium*, etc. after the flowering period. Dormant bulbs must be attended to when without foliage. The removal of the offset allows the main bulb to increase in vigor and give the best results. Be careful about the removal of the bulblets

for rough handling may result in these being damaged. Caladium offsets have often to be cut off the main bulb and should be dried a few hours before planting otherwise the freshly cut surface may attract fungus spores and rot.

Diseases and Pests.—We have to contend with a black caterpillar which propagates itself with great rapidity and from a single individual, which may have escaped destruction and formed a chrysalis below ground, a moth will result to lay thousands of eggs, each producing a voracious grub whose sole end in life appears to be eating. When the foliage and flower buds fail to satisfy his appetite, down will he delve to the heart of the bulb and the ruination of the plant result. Kill on sight moth or caterpillar; the yellow wasp is a great help too for he enjoys a succulent caterpillar but one does not like to propagate this stinging creature !

Fungus will attack a bulb, a white mass of hair-like material forming round the bulb which soon rots. Burn the bulb and soil and, if in the ground, lime the spot before placing fresh earth in the hole.

Another fungus attacks delicate imported bulbs especially *Amaryllis*. The leaves show rust coloured spots and blotches. One should not lay deaths due to careless treatment, overwatering, bad drainage or wrong manuring at the door of fungus but in all cases of disease it is best to burn the bulbs and sterilise the soil by fire if possible. Otherwise bury the material deep. Soak imported bulbs, if there is any fear of infection from disease, in 1 part Carbolic acid to 40 of water for three hours. If the bulb is not badly affected water the soil once a week with a pink solution of Permanganate of potash.

Eucharis and *Amaryllis* will often send up flower stalks marbled with pale yellowish green not the healthy dark shade of a normal plant, a weak dose of Sulphate of iron is a corrective in this case.

What to grow on the Hills.

There is a great difference between the type of imported bulb grown on the hills and on the plains. With an elevation of 2000 feet or more all the imported varieties will do well and one has only to recollect the season of year when they usually flower and plant accordingly.

The following bulbs are recommended for Hill planting :—

Agapanthus, Anemone, Arum, Babiana, Begonia, Belladonna Lilies, Calla, Crocus, Cyclamen, Daffodil, Freesia, Gesnera, Gloxinia, Hyacinth, Imantophyllum, Iris, Ixia, Jonquil, Lachenalia, Lilium, Lycoris, Montbretia, Naeglia, Narcissus, Nerine, Ranunculus, Scilla, Snowdrop, Sparaxis, Sprekelia, Tigridia, Tritoma, Tuberos Begonia, Tulip, Tydaea, Watsonia.

Bulbs that flower in the spring must be in the ground between December and January. A good deal depends on the frost as at mild elevations the spring bulbs can lie unharmed if planted in October. Plant these early, Crocus, Anemone, Snowdrop, Scilla, Tulip, Ranunculus, and Hyacinth followed by Narcissus, Gladiolus, Iris, etc., in February-April.

What to grow on the Plains.

On the plains one can attempt growing a few of the imported types such as Hyacinth, Narcissus, etc., but successful results are not often reported. The Japanese and Chinese Sacred Narcissus which have delightful scented flowers are the only ones of the Narcissii, Jonquil or Daffodil family that are worth cultivating. These bulbs can be grown in fibre, leafmould or in water with marble chips and every bulb will bloom, 2-3 spikes being produced on the larger sized ones. They will however be of no use a second season.

Lilium auratum, tigrinum, etc., have flowered in Calcutta but in June-July, bearing an apology for a flower too. *Gloxinia* call for a lot of attention and are not worth it.

Of the *Achimenes*, only the purple form which is very hardy, is recommended for the plains, this can be grown in hanging baskets, pots or rockeries. The tubers should be replanted in January to March in light rich soil, pinch back the tips to bush out the plant and flowers will be in full bloom by June lasting till the end of the rains, allow the plants to die down and store as recommended. White, red and blue shades are obtainable in *Achimenes* but are recommended only for Hill cultivation.

Crinum. Most of these differ but little from one another, white with a pale or deep pink stripe down the centre of each petal being the general colouring. *superbum* which has immense heads of narrow petalled flowers pale pink in colour, is very sweet scented and hardy. *Asiaticum* has big bunches of white flowers also narrow petalled,



Sprekelia formosissima.

The *Alpinia* do not bear very beautiful flowers, white with stripes of reddish yellow but are useful for shady and moist situations. The evergreen foliage is like the *Hedychium* with flowers borne in the rains.

Amomum have beautiful flower bracts, a short head 12"-18" high of soft pink and cream shades going into a deeper red at the top with an insignificant yellow flower almost hidden in the bract. The leaf is rather coarse and heavy like a *Heliconia*; the bulb should be grown in a border. *Amomum* flower in April-May.

Caladium. Delicate varieties of these beautiful plants are difficult to cultivate for any length of time in lower Bengal but the hardier kinds are very fine. The dormant bulb commences to sprout in February-March and should be transplanted into a compost of one part each leaf mould, sandy soil and old cow manure. Water sparingly till the leaf sheath is three inches high when a regular dose of liquid Guano or Cow manure should be given every week. Remove the flower spike as soon as it shows for this saps the strength of the leaf. The *Caladium* should not be kept in too shady a position as this tends to draw up the leaf stalk and reduce the bright colouring. Stake the *Caladium* early and never water over head as dust will collect on the foliage and spoil the leaf. The brilliant foliage loses colour till by the end of August it is more or less green with white or red markings. Gradually reduce watering from October onwards until the leaves turn yellow and die back, when the pot can be turned over on its side or the bulbs taken out and stored in dry sand. The *Caladium* can also be grown under trees or in a fernery and left in the ground right through the year, mark the spot where the bulb lies with a stake to prevent the mali from carelessly cutting it in pieces when he uses his *nironee*. *Caladiums* are particularly free from pests, the caterpillar of one of the hawk moth family might eat the leaves but a daily examination of the plants will soon discover the marauder. *C. argyriles* is a dwarf white leaved type in great demand for edging and the cut flower trade.

The *Canna* is dealt with in Chapter Nineteen.

Cipura plicata and *paludosa*; these are miniature white Iris with peculiar plaited leaves, which open in the evening and close before sunrise, flowering in the wet weather and can be grown in shady moist places.

Cooperia are white evening opening "Crocus"; combined with *Zephyranthes*, the "Flower of the Wind", they have given a hybrid race *Cooperanthes* introduced by the author in 1904. The *Zephyranthes* are in yellow (*sulphurea*), deep pink (*rosea* and *robusta*), white (*candida* and *recreunda*) but *Cooperanthes* have a wider range of shade from white through shades of yellow, pink and orange to a deep red. While the *Zephyranthes* do not flower till the Monsoon starts, the *Cooperanthes* are very lavish and within 48 hours of a good shower of rain, at any time of the year, send up sheaves of bloom.

Costus speciosa and *Curcuma* must be relegated to the background for they are only useful as stop gaps, the former has white flowers with reddish bracts, the plants growing like the *Hedychium*. *Curcuma* produces an *Amomum*-like spike of yellow flowers and *Hedychium*-like growth.

Eurycles is often confused with *Funkia* which is not worth cultivating on the plains but the plants are quite distinct from one another; the former resembles *Eucharis* in shape of flower, but borne erect and not drooping and is worth growing. Treat this bulb like *Eucharis*.

Eucharis has its likes and dislikes as regards position, a north-east aspect being ideal and gives the best results. The soil should be rather heavy instead of sandy and rich while the bulbs must not be disturbed at regular intervals. If the earth washes out and the bulb sinks below the level of the pot, carefully toss out the ball of earth, round off the corners, refill in crocks and some rich earth and raise the bulbs. *Eucharis* are destroyed by the black lily caterpillar which is very partial to the leaf and bulb of this lily. Give liquid manure when spikes show and keep the pots on cinders or raised on a brick to avoid the earth worm menace. This bulb is liable to a fungus which makes the flowers stalk mottled.

The *Freesia* has apparently been cast aside by amateurs because undeveloped bulbs or ones not properly matured have failed to flower. Large acclimatised bulbs if planted in September bloom quite well by February. The *Freesia* is one of the bulbous plants most amenable to pot cultivation. Use as a potting mixture two parts garden soil, one leafmould and one cow manure, if the garden

soil is heavy mix in a handful of sand. Plant 3 bulbs per 6" pot just covering them with soil, grow in full light but not in direct sunshine and support with light stakes shortly after the leaves come above ground. As the plants develop weak doses of liquid manure, Guano for preference, should be given. The after treatment of the bulbs will decide whether you will obtain flowers or not the following year; when removing the flowers do not cut off more foliage than is necessary, continue feeding the plant with liquid manure till the leaves show signs of yellowing when water should be withheld and the pots allowed to gradually dry off. Turn the pots over on their sides and allow them to lie drying for a month or so before the bulbs are tossed out and stored.

Gladiolus can be recommended for general cultivation. Plant the bulbs 2"-3" deep in light rich soil and stake the shoot before it is 6 inches high otherwise a bent stem and twisted flower spike will be the result. Imported bulbs or those acclimatised give equally good results. Try and plant in September-October so as to obtain results before the very hot winds shrivel the delicate petals of the flower. Spikes have been cut on the plains nearly every month of the year. Never let the roots become dry, one good soaking a week should be sufficient except during the very hot weather. In pots add a rich top dressing when the plant has made 6 inches of growth. When bulbs show signs of dry or hard rot change the plot of ground.

Haemanthus, the Blood flower, looks like a glorified scarlet Powder Puff and is a short lived beauty, the flowers last for a week or ten days and as the bulb increases with age so does the size of flower head. The flower appear in March-April and is followed by coarse leaves

The Japanese Day Lilies, *Heimerocallis*, are quite a useful family, all the varieties are yellow ranging from a pale citron to a deep tawny orange and nearly all are hardy and prolific on the plains. The grass like leaves form a good back ground for the flowers which are borne on long stems. Grown in shade or sun they flower in the early hot weather.

Among the rhizome type of plants, *Hedychium* varieties are worth cultivating but this plant must not be buried too deeply. The rhizome in its natural habit looks like a centipede, the roots anchoring

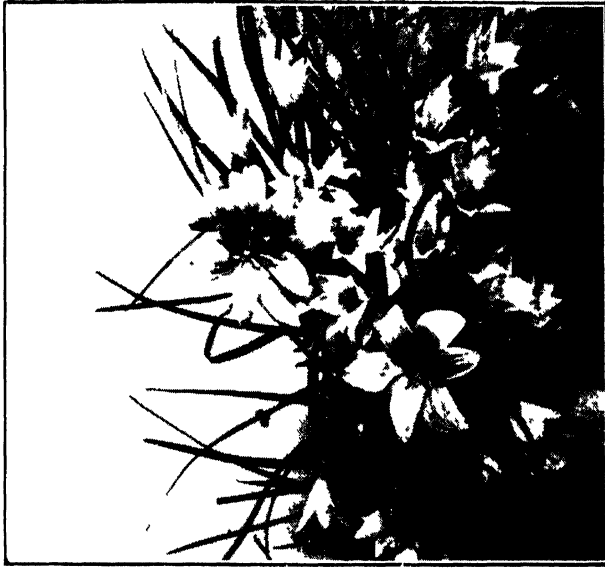
the long rhizomes which lie on the surface of the soil. The flowers of *Hedychium* are produced in the rains and some are sweet scented. The plants do excellently in semi-shade, and the general height of the plants is 3 to 4 feet though *elatum* grows 6'-7' high. *coronarium* the largest flowered and most grown, is a dead white but there are quite a variety for medium elevations, a deep scarlet, yellows and several with white flowers. On the plains grow *coronarium*, *coeruleum*, *elatum* and *coronarium flavum*.

Hyacinth can be grown in leafmould mixed with pieces of charcoal or cinders the size of a pea, or in special Hyacinth glasses in water. Damp the potting material, plant the bulb just below the surface of the soil and keep the pots in a dark room for a month or six weeks. Examine by tossing out a bulb and when the pot is full of roots bring it into full sunshine and by placing an empty pot reversed over the bulb, force the spike. The covering pot should not be removed till the spike is a couple of inches above ground otherwise the flowers will open in the "collar" of the bulb. Hyacinths from "forced", "specially prepared" or usual size bulbs, seldom produce more than 10% of decent flower spikes on the plains, most of them open buds in a half hearted fashion or rot before the spike is a couple of inches high. Plant in September-October.

Hymenocallis and *Pancreatium* are very closely allied, the former being rather more delicate in beauty and difficult to rear on the plains. For cut flowers the *Pancreatium* has few equals. The common kind *longifolium* called the *Spider lily*, has scented flowers and is in great demand by florists. *Pancreatiums* love a swampy soil. There is the dwarf wide leaved *parvum* and *latifolium* intermediate between *longifolium* and *parvum*, both which are worth growing. Flowers appear for nearly ten months out of the twelve

Kaempferia and *Cienkowskia Kirkii*.—The flowers of these "bulbs" are short lived and open in the rains, *Cienkowskia* is certainly a very beautiful flower, 2½" across, pale pink with a gold eye but the small flowered *Kaempferias*, in white and pinky mauve grow close to the ground and are succeeded by ornamental foliage. All these varieties do well in the shade and are generally grown in rockeries.

Lilium longiflorum.—The first requirement is a fair sized bulb, the ones as large as a walnut will only bear a single flower,



Zephyranthes robusta & candida.
(*Page 190.*)



Cooperianthes hybrids.
(*Page 190.*)

Iris like stiff well drained soil to which lime rubbish and 4 ozs. of bone meal per square yard has been added. Do not bury the rhizome two deep. In pots the soil should be well drained and kept moist but too much shade is not necessary. With the exception of the blue *chinensis* all other kinds of *Iris* are purely Hill types. Plant in the rains.

Polianthes—The Tuberose (*Rajanigundo*) is a great favourite with the Indian, but its strong scented flowers makes it disliked by most Europeans. Of easy culture, growing in sun or semi-shade, the Tuberose is worth growing for cut flowers. The double flowered type called *The Pearl* is the best. The bulbs should be lifted every couple of years and offsets transplanted into rich soil, apparently no insect or disease attacks the Tuberose and neglected patches respond to replanting and manure.

The *Arum lily*, *Richardia Aethiopica* is best seen on the Hills near running water. It can be cultivated in pots but seldom flowers well on the plains except in the Punjab perhaps. The plant dies down in June, lying dormant till September when the bulbs should be repotted in rich soil or given a rich top dressing if not repotted. The flowers follow from February to May. A good supply of water is always necessary to keep the plant growing. If grown on the plains remember that the *Arum* is a water loving plant and keep it fairly moist always.

CHAPTER TWENTY-ONE.

PALMS.

The amateur who is acquainted with perhaps a dozen varieties of palms altogether would be surprised were you to mention that this number could be quadrupled quite easily.

Of course some kinds are not of much interest and do not enter into the general run of gardening but in the selection given below some of the best and most easily cultivated are mentioned.

How to Grow.

Compost. Too much leafmould should never be mixed into the compost for palms, one third leafmould to two thirds garden soil is a safe mixture. Little manure is required, a dose of Sulphate of ammonia once a month for pot plants being sufficient to deepen the colour of the foliage. For this one quarter ounce to a gallon of water is quite sufficient.

Treatment. Palms on the whole are very hardy plants and can stand a lot of rough treatment. Once the root of a ground specimen has gripped the soil, fire is about the only agency that may work its destruction. Heat will burn foliage, cold do the same, but with the return of normal weather conditions the palm recovers.

Do not allow dead leaves to hang on the plant. Some varieties kindly drop their foliage when done with, for instance the *Oreodoxa*, though the heavy leaf sheath breaks anything on which it may descend ; others like the Date, *Dyppsis*, etc., hang on to the dried fronds till they are removed by human agency or blown away by a storm. Clean the stems of such palms and they will not harbour insects, weeds or fungus. The fruiting of a palm reduces the strength of the plant, Sago Palms (*Caryota*) live longer if the flower spike is cut off as it appears.

Pests and Diseases. There are few diseases that attack palms in gardens, scale insects on the leaves of indoor specimens and caterpillars of various kinds may be but none are a real menace except the rhinoceros beetle which bores into the stem of the larger plants just below a new leaf and thus destroys the leaf bud.

An epidemic fungus disease that rots the heads of Coconuts is serious but seldom attacks palms in gardens.

Cycas loses its young foliage by the united attacks of hundreds of caterpillars which develop into tiny blue butterflies, a Kerosene emulsion will rid you of this pest.

There is no such plant as a "dwarf palm", amateurs fondly imagine that the China Palm, *Livistona rotundifolia* never grows tall, let them transfer it to the ground and within a dozen years it will be twenty feet high ultimately reaching a height of 40 feet or more. Rattans, *Calamus* and *Daemonorops* grow 500 feet long and are armed not only with thorns on the stem and back of the leaf, but carry long whip cord-like grappling hooks from the ends of the leaf. These help the plant to climb. The *Rhapis* are comparatively dwarf growing only 8-12 feet.

To keep a palm from growing too quickly in the ground the plant should be buried in its pot. This restricts root growth to a certain extent and helps the *Orcodoxa regia* and *Hyophorbe amari-caulis* for instance, to form that ornamental bottle stem so much desired.

To grow a palm from seed is a slow process as it takes years before the true leaves form and the plant is worth looking at. The seedlings should be lifted after the first pair of leaves appear, the roots balled and the palm replanted in the ground or potted off. Palms, if allowed to remain untouched too long, are apt to send their roots deep into the ground and suffer badly when dug up. *Borassus* and *Hyphaene* are almost impossible to grow in pots owing to the long roots these palms produce.

It is very difficult to give common names to Palms while a detailed description would be adding an unnecessary amount of information appreciated by very few.

Rare Palms have not been referred to, there are quite a few handsome kinds that require more care than an amateur can give to them but some peculiar palms are mentioned below for those who are keen and wish to compete at local flower shows, etc.

Acanthorhiza aculeata is heavily armed with hard spike-like aerial roots on the trunk which resembled branched spines.

Acanthophaenix, *Martinezia*, *Astrocaryum*, *Bactris*, *Zalacca*, *Calamus*, *Daemonorops* and *Oncosperma* have thorns on stems and leaves, nasty customers to cultivate in a small garden.



Pandanus utilis.
(*Page 198.*)



Cycas Rumphii.
(*Page 198.*)



Ravenala madagascariensis.
(*Pinnæ* 917)



Caladium varietie.

In *Areca Aluceae* the new leaf is a beautiful wine red when it first appears and when small is quite a handsome type.

Washingtonia filifera has long thread-like appendages to its leaves and unique in this way.

Stevensonia grandifolia and *Verschaffeltia splendida* differ from the general run of palms in having their foliage shaded and veined with yellow.

Cyrtostachys lucca possesses leaf stalks and sheaths a sealing wax red in shade but is rather delicate and requires a very moist climate.

Nipa fruticans is a water plant pure and simple and *Hyphaenr Thebaica* (Doum Palm) is the one naturally branched palm. Date Palms are occasionally branched, a seven headed one having been reported.

Sago does not come from either *Caryota* or *Cycas*, both erroneously called Sago Palms, but from *Metroxylon Sagus* which does not grow in India.

What to grow. Palms for indoor pot work are referred to in Chapter Twenty-one where hints as to their cultivation are also given. Palms for planting in the ground should be carefully picked.

For Avenue purposes, *Oreodoxa* heads the list then *Caryota urens* and *Arenga saccharifera*, *Corypha* and *Borassus*. *Dypsis*, *Kentia McArthurii*, and *Caryota sobolifera* form dwarfer semi-bushy types and are also in favour.

Some palms will grow in swamp conditions and reference should be made to Chapter Twenty-seven for these. On the hills *Livistona mauritiana*, *Chameroops*, *Caryota*, and *Wallichia* will be found up to 2000-3000 feet. But in very dry hot localities *Livistona mauritiana* alone survives.

Those that belong to the "feather leaved" section are *Attalea Cohune*, *Areca lutescens*, *Bentinckia nicobarica*, *Calamns* of various kinds, *Cocos flexuosa*, *C. schizophylla*, *Dictyosperma rubra*, *Dypsis madagascariensis*, *Elais guineensis*, *Hyophorbe amaricanlis*, *H. Verschaffeltii*, *Kentia McArthurii*, *K. Sanderiana*, *K. Belmoreana*, *Oreodoxa regia*, *Phoenix rupicola*, *P. Roebelini*, *P. reclinata*, *Pinanga* in variety, *Ptychosperma angustifolia*, *Ptychoraphis angusta*, and *Seaforthia elegans*.

Among the "fan leaved" types grow *Chamærops humilis*, *Latania Commersoni*, *Licuala horrida*, *L. grandis* (*Pritchardia*), *Livistona rotundifolia*, *L. mauritiana*, *Pritchardia pacifica*, *Sabal* in variety, *Thrinax argentea*, *T. excelsa* and *Washingtonia robusta*.

There is the "fish leaved" section to which *Arenga*, *Caryota* and *Wallichia* are allocated. All these are tall growing.

The *Rhapis* are dwarf bushy rattan-like palms and excellent for pot growing or specimen bushes in a garden.

Allied Plants. The *Carludovica* and *Cyclanthus* are not very widely separated from Palms and would fall under the fan leaved section ; the *Pandanus* (*Keora*, *Ketaki*) with strap shaped leaves is well known, the varieties *inermis* and *Baptistii* are unarmed but the others have fine saw teeth on the back of the midrib and edges of the leaves. *Veitchii*, *V. variegatus*, *Sunderi*, *odoratissimus*, *utilis* and *pacificus* are the best to grow for decorative purposes. *Sunderi* is variegated permanently with yellow but both the typical *Veitchii* and *odoratissimus* have the new leaves creamy white and broadly margined pale yellow respectively, only for a short while.

The *Cycadeae* are often referred to as Palms though they are more closely related to the Pines. *Cycas Rumphii* and *revoluta*, the *Sago Palm* of Japan, together with *Macrozamia spiralis* and *Encephalartos Caffra* are the varieties generally found in Botanical gardens. The *Cycas* however are worth growing.

CHAPTER TWENTY-TWO.

FERNS.

The Hills are the natural home of the fern and it is quite impossible to acclimatise some of the varieties found at high elevations. Try and raise ferns from spores which might give you a result on the plains but never be a vandal and uproot ferns which will only die a few months after they have left their natural habitat.

Where to grow.—Ferns do best in a north or a north-east aspect where they get the morning sun and none in the afternoon but under the shelter of a fernery they will grow in any situation. *Nephrolepis exaltata* and such coarse varieties can stand the full sun during the Monsoon and winter months on the south but need to be shaded for a couple of months in the very hot weather. Fans and electric light have a bad effect on delicate ferns in pots and where ever possible these plants should be frequently changed and given a week or two out of doors to recuperate.

How to grow.—Use medium sized pots, 7 to 9 inches is quite large enough except for "specimens" when shallow seed pans of 10"-14" diameter are better than 10 or 12 inch pots. When transplanting do not commence with a bushy plant for, as the fern grows and spreads, it will soon fill the pot with roots and lose strength.

Don't bury the crown of the fern below the soil, a common mistake which accounts for many deaths. Syringe the foliage every few days in dry weather.

Compost for pot plants.—The chief trouble with ferns usually lies in the wrong compost which malis use. Most varieties grow in hilly country and to imitate this soil should be the aim. Use one-third each leafmould, garden soil (not clay) and coarse sand or clinkers. If at all possible obtain old roof rubbish and lime mortar pounded up and use this in place of sand. Ferns should not be kept in a saucer of water but given a thorough soaking every day during the hot weather or a daily watering overhead; if continually indoors water once every couple of days during the cold and wet weather. A dusting of crushed Limestone every few months

will correct any tendency to sourness of the soil and do no harm to the plant while a pinch of bone meal or bone dust during the rains will ensure leafy plants in the cold weather.

Repot ferns every year, split up full pots removing all dead portions of stem and roots without the entire removal of soil.

Ferns enjoy a moist situation and if rockery work is provided for them to nestle up to, they will repay you by depositing spores to increase their species. Hundreds of new seedlings will spring up once the stone has become "patined" with vegetable mould or a lichen-like substance.

Pests and Diseases.—Most ferns are attacked by a caterpillar, green or grey black in colour, discovered only when the leaflets disappear. A careful search soon reveals the rascal either at the roots or camouflaged as a portion of the stem.

A scale insect is common on indoor ferns, often the foliage is so affected as to require entire removal to eradicate the disease.

On occasion white ants eat away the fronds from just below ground level, a grasshopper or cricket is another sinner in this way. If the old dead roots and stems are not regularly cleaned out fungus and insects are invited to add to the troubles of the amateur. On the whole if the compost is correct the ravages of insects will not be felt.

What to grow.—The following list of hardy ferns might be of assistance to the amateur.

For hanging baskets.—*Nephrolepis bostonensis* and sports, *Adiantum ciliatum*, *Lygodium scandens*, various kinds of *Polypodium* and *Davallia*, *Selaginella* of sorts.

For indoor decoration.—*Adiantum tenerum*, *elegantissimum*, *trapeziforme*, *peruvianum*, *hybridum*; *Pteris Victoriae*, *Mariesii*, *cretica-albo lineata*, *ludens*; *Nephrolepis Piersonii* types, *rufescens*, *furcans*, and *cordifolia* types; *Davallia fijiensis*; *Polypodium* in variety; *Blechnum occidentale*; *Onychium japonicum*.

For outdoor work in pots.—*Polypodium* of sorts; *Nephrolepis furcans*, *exaltata*, etc.; *Nephrodium cuspidatum*, *molle*; *Pteris longifolia*, *ensiformis*, *ludens*, *serrulata*; *Adiantum trapeziforme*, *peruvianum*, *hybridum*, *tenerum*.

General planting in the ground.—In a fernery the selection can be varied according to the growers own fancy and a collection of 20 to 30 varieties easily obtained.

The cultivation of ferns under glass is going “out of fashion” and consequently such fine “double” ferns as *Adiantum Farleyense*, *Pacottii*, *imbricatum*, etc., are seldom seen.

Specimen forming varieties are *Adiantum peruvianum*, *Asplenium Avis-Nidus*, *Pteris quadriaurita* and *Nephrolepis cordifolia gigantea*.

Climbing types are *Lygodium* in variety, *Diplazium sylvaticum*, and *Selaginella laevigata*.

The *Selaginella* types are useful for covering a rockery, *canescens argentea* has a silvery appearance, *metallica*, blue and *rubella*, bronzy. *serpens* is very hardy but coarse. *erythropus*, *Africana*, *Braunei*, *gracilis* and *haematodes* are dwarf bushy growing.

Marsh loving. While ferns can stand a lot of moisture they should not be subjected to overhead drip or the roots allowed to lie in water ; if the roots go towards water well and good. *Acrostichum*, *Angiopteris*, *Ceratopteris* and *Marsilea* are known to thrive in swampy land and will grow in moist situations.

Epiphytal. These are the *Drynaria*, *Platycterium*, *Polypodium* and *Davallia* which are purely epiphytal, the first two living on tree trunks, the others though rooting in soil are more at home on the bark of trees.

CHAPTER TWENTY-THREE,

FERN HOUSE PLANTS.

Walk into an amateur's fern house and in nine cases out of ten it will be found to contain pots of Maidenhair, a hanging basket or two, possibly an *Asparagus plumosus* and some *Begonias*, there may be a little *Selaginella* covering the rockery if this exists and some *Wandering Jew*.

But there is no reason why a better selection can not be planted and perhaps the following suggestions might help. The *raison d'être* for the fern house is firstly to supply plants for indoor decoration and foliage for cutting and secondly grow a class of plant that will not thrive in the open without shade.

Situation of the Fern House.—Here we have to depend a good deal on the ground available, east and north-east sun is excellent and the fern house can remain open on both these sides but it must be shaded on the top, the south and the west. Where one cannot obtain the right site more shade should be given on south and west. Never make the fern house in the shade of heavy foliaged trees, the drip from the leaves is certain to rot plants.

Fern houses are built of angle iron, wood or bamboo, covered with wire netting in most instances; pick on well matured bamboo or better still let the main uprights be of giran, sal or any wood that does not rot away quickly; always tar the ends in the ground. A sloping roof helps to lessen drip to a great extent.

A good way of covering iron posts is to build around them, after they have been heavily painted or tarred, a series of earthenware (unglazed) drain pipes. Earth with cow manure is plastered on and *Adiantum Capillus Veneris*, the wild low growing Maidenhair fern, can be placed and held in position with fine mesh wire netting; in a short while the fern will grip the pipe with its own roots. *Polypodium* too can be grown in this way.

Thatching.—This is an important matter. Too heavy shade draws up the foliage and makes it sappy and weak, too little on the other hand allows the sun to burn and destroy the colour. To obtain the happy medium, allow 50% of sunlight to filter through

during the hottest months, in the rains when the sun is not so strong and the sky overcast for long periods, the thatching should be thinned out and again in the cold months more light must be admitted. Dry palm leaves used for thatching shrivel in the heat and are eaten by a caterpillar as well while during the wet weather the leaves rot and the shade is thus naturally reduced. Grass rots too but never thatch too thickly with this material.

Hessian is too heavy except for just a short period of the year, then it rots with wet weather unless preserved with crude oil and paint; again, if not tied down carefully, heavy winds are apt to blow a Hessian covering to pieces. Coarse coir string is commonly used as being everlasting being woven in and out of the wire netting. "It sure is", as our American cousins would say, but it is ugly and does not allow for any reduction of shade.

Layout and design.—*Pot house.* Where space is limited pots are usually arranged on wooden benches; resting on cinders they do better or if trays of sheet iron or galvanised material are used where brick work cannot be arranged for, and filled with cinders, plants will grow strongly. Where wood work is the only material available, have the wood creosoted, tarred or painted thoroughly, keep it scrupulously clean and every now and then shift the pots so that any washings of earth do not collect on the wood. Try and avoid a draughty fern house and shelter from the north or from whatever direction the wind blows.

Soil.—For pot plants let the material be coarsely sieved and use two thirds garden soil; to one-third leafmould, adding a small quantity of sand or fine cinders if the soil is heavy, say a handful to a six inch pot. Pot in the usual manner, keeping plants in the centre of the pot, do not bury too deep and stake any plants taller than 6".

For Ferns, change the compost to that recommended for this section of plants.

Watering.—If the compost is correct, watering once a day is quite sufficient except in the very hottest weather when a second watering will be necessary. In the winter months once every two to three days should be the rule. Syringe plants regularly and in smoky localities wash the foliage of large leaved plants once a week with a sponge or soft rag and soapy water,

Remember that in Calcutta the amateur often has only brackish water from the unfiltered main at his disposal, this is bad for succulents which rot off. Use filtered water or that from a tank or tube well. Never syringe with unfiltered water as the mud in suspension is apt to leave stains on the leaves which are difficult to remove.

Manure.—A pinch of bone meal per plant when in growth is of great help, ferns need a teaspoonful of lime-stone or powdered mortar every 6 months, a weak dose of Sulphate of ammonia or Nitrate of soda, $\frac{1}{4}$ oz to a gallon of water, is a tonic for all other fern house plants except ferns.

Design of Rockery bed. Work from a plan allowing at least 4 ft. between beds, make your individual shapes as simple as possible but irregular in outline such as triangles with curved sides and rounded angles, etc.

Do not make the general design too regular. I mean in a large 50' fernery for instance, if a narrow bed is arranged up against the north-east side, do not carry the idea right round the house, repeat it on the south-west.

In arranging a fernery do not make the slope of growth too regular, a dot plant taller than the undergrowth is an excellent way of breaking up the rockery. Follow nature, plant in colonies or several plants together especially of the dwarf and medium sized plants. Ornamental climbers up the posts or grown on rustic branches are also very artistic.

When building a rockery, do not make the slope of earth too steep, a terracing will be far preferable with brick work as a backing to take the place of more flimsy material or banked up earth. Arrange for good drainage, a core of large clinkers or cinders with a fall to some drain. The bank of earth can be held in position with clinkers, fused bricks or lumps of roof rubbish *i.e.* mortar and khoa, united in a conglomerate mass. These piled so as to dovetail into each other will hold the earth in position.

Selaginella argentea or some other moss-like *Nephrolepis*, *Fittonia*, *Pellionia* and *Cyanotis* help to cover the nakedness of the bare stone.

Prepare the top layer of earth in the bed with equal parts of fine cinder or gravel, leafmould and sand, and dig this in to a depth of a couple of inches. When planting any deeper rooting plant use some extra compost to fill the pit. Forking up the soil every few months is a great help to plants but once *Selaginella* has covered the soil this must of course cease. Once a year, however, just as the rains break it is advisable to lift *Selaginella* and the smaller plants, fork up the soil, add a top dressing and then replace every thing.

Watering. If the soil is porous there will be no difficulty about flooding or watering thoroughly with the "bumba" (watering can) during the hot months. A good syringing in the early hours of the day is also helpful and to create a moist atmosphere flood the roads every morning. During the Rains look out for drip which is fatal to foliage and see that the exposed portions of earth, which are rather steeply banked, do not get washed away. Never use brackish water.

Pests. Caterpillars of various kinds feed on foliage, the immense caterpillar of the Hawk Moth and other Sphingideae damage *Caladiums*. These must be picked off. Crickets are also destructive, eating down tender foliage but can easily be flooded out. Grasshoppers, especially the immature ones, are great pests and ruin the tender *Dracaena* and *Croton* leaves at the end of the rains. Snails and slugs are also destructive usually living under low growing material such as *Pittonia* and *Begonias*. The Woolly Aphis, Scale insects etc., are all of small account but must not be neglected when discovered.

Earthworms are a nuisance too, aerating the soil is true but at the same time making an awful mess of the place especially when the new ones hatch out in large numbers; a weak dose of lime water will bring most of these creatures to the surface.

Care and Attention. Remove dead and dying foliage and never make the mistake of having too much deciduous material all in one spot to show a gap in the cold weather. It is a good plan to sink 6" or 8" empty pots here and there in the rockery into which *Cineraria*, *Geranium*, etc., can be placed and removed as they finish blooming. In this way a fern house can be made quite gay for many months of the year. During the off season foliage plants can fill the vacancies,



Geibera Jamesoni.
(*Page 215*)



Coleus variegatus.
(*Page 60*)



Plumeria tuberculata.
(*Page 136*)



Barleria
bracteata
hybrida
(*Page 128*)

For Pot Growing. The reader should refer to Chapter Twelve which deals with the great majority of varieties which can be grown in pots ; the selection can be varied somewhat with a little thought according to climatic conditions.

For Planting in the Ground. A great deal depends on the climate but the selection given below is most suited to moist conditions as prevail in Bengal.

Ferns. Almost any variety can be grown except *Adiantum Parleyense* or a few other delicate varieties which want glass to obtain first class results.

These are the best—*Adiantum Collisii, tenerum, hybridum, trapeziforme, peruvianum, caudatum, Capillus-Veneris* and *Fergusonii*.

Varieties of *Aspidium, Asplenium, Blechnum, Cheilanthes* (Silver) and *Gymnogramme* (Gold) ferns, *Pteris* and *Selaginella* make up a formidable list.

Palms. Any variety can be used but sink the pot in the rockery both to keep the plant dwarf and simplify removal when the palm grows too large for the situation.

Orchids. *Phaius Wallichii* and other terrestrial varieties can be planted *in situ*. Of course baskets of hanging orchids are all right if a proper place is built for them or they are grown on the posts of the fern house.

Flowering Shrubs. There are a number which can be grown to advantage in a fern house with a normal amount of light.

Clerodendron, Crossandra, Cyrtanthera, Dalechampia, Desmodium, Mussacuda, Pentas, Polygonum, Ruellia, Tiliolum and *Thespesia lampas*.

With a little more sunlight a larger selection can be planted and if the shading is carefully arranged you may obtain flowers in profusion without injuring the foliage plants.

Foliage Shrubs. There is no need to differentiate what varieties can or cannot be used, the slower growing can go direct into the soil. Crotons, Dracaenas, etc., which soon lose colour or become "leggy" if kept in pots, can be replaced with newly made

gooties each October. Numbers of succulent and herbaceous plants also bulbs and tubers can be included.

Lilies. *Hemerocallis*, *Eurycles*, *Funkia*, even *Zephyranthes*, *Eucharis*, *Amaryllis reticulatum*, *Achimenes*, *Globba*, *Iris*, *Tacca*, and *Anthurium* will all flower.

Succulents. The *Billbergia* and others of the Pineapple family, *Begonia*, foliage and flowering types, *Impatiens*, *Gesnera refulgens* *Commelina*, *Cyrtodeira*, *Eomecon*, *Kalanchoe*, *Musa*, *Saintpaulia*, *Tetranema*, *Cienkowskia*, *Kaempferia*, *Costus*, *Ornithogallum*, *Colens*, *Alocasia* and *Caladium* are a few more "possibles" for growing.

CHAPTER TWENTY FOUR.

SUCCULENTS & PERENNIAL HERBS.

The cultivation of true succulents is not attended with any great success in moist Bengal, in the drier parts of the Province and upcountry stations Cactus and the class of plant usually associated therewith, do thrive and provide interesting objects perhaps more curious than beautiful.

In this chapter are considered members of the Cactus family and such as have succulent leaves, Aloe, Agave, etc., as well as plants belonging to the Euphorbiaceae and the fleshy herbaceous type such as Dieffenbachia, etc. We also refer to the section belonging to the Pine-apple and Plantain families and such undershrubs as are too small for the usual shrubbery. Rather a mixed selection you will consider it by the time you have read the chapter through.

Damp is liable to rot these plants unless good drainage and proper compost is given and, with all this care, during heavy rain the more delicate ones have to be placed under glass.

Soil. Always see that the soil for succulents is coarsely sieved. A compost containing one half cinders or finely powdered lime rubbish and a quarter each garden soil and leafmould is a good medium to use,

Where plants are grown in pots see that the drainage is perfect and with the compost mix in cinders or stone chips, a handful to a six inch pot, to ensure better drainage.

Rock Garden. In the ground give a foundation of broken bricks and with clinkers, pieces of old roof rubbish or concrete make an irregular rock garden with pockets of compost. A rockery of succulents is best in full sunlight, if during the very hot weather plants show signs of burning slight shade can be provided. The following will provide a selection for this garden. *Linum*, *Euphorbia*, *Cactus*, *Aster amellus*, *Zinnia linearis*, *Ruellia*, *Oxalis*, *Ficus* and *Tradescantia*.

In among the succulents *Portulaca*, *Verbena perennis*, *Sedum*, *Pilea* or *Hymenanthemum* is often grown but never let the soil be too heavily covered.

What to grow. There is first the Arum family represented by the *Aglaonema*, *Dieffenbachia* and *Schismatoglottis* which can be used for pot cultivation or shady rockeries.

In *Aglaonema nobile* and sub-varieties we have dwarf types which form no stems with dark green leaves, feathered veins and dots of white. *A. Roebelinii* is the best of the tall section and the brightest barred and *pictum* of the blotched type.

Dieffenbachia has quite a number of forms with leaves variegated or blotched irregularly with white or yellow. *Baumanni*, *magnifica*, *eburnea* and *princeps* are the best. When the stems become tall and bare of foliage simply cut the plant down to a couple of inches from the base and let the new shoots come up.

Schismatoglottis siamensis and *pulchra* are similar in growth to *Aglaonema nobile*; *neo guineensis* on the other hand is more like an *Anthurium* in general appearance.

The *Alocasia* can be divided into two sections; tall, such as *bataviensis*, *gigantea*, *indica variegata*, *macrohiza variegata*, *violacea* and *zebrina*, with plants growing 5' to 8' in height and leaves of immense size, 3 to 5 feet in length by 3 feet in width. These do well in outside rockeries. The smaller type are more manageable for fernery work and the most hardy are *argyreia*, *Thibautiana*, *Putzei*, *Sunderiana*, *Jenningsii* and *Lowii*. Unfortunately the cold effects these plants and foliage falls so that during December-February the leaves are entirely missing or represented by apologies too mean to acknowledge. *Alocasia* should be treated like *Caladium*, the tall type calling for little care however.

In *Anthurium* we have Aroids that give flowering and foliage types for use in shady situations. Among the flowering species in which the coloured spathe is red or white we number the pink *Ferricense* in several shades notably *rubrum*, with deep scarlet spathes, then *Decharidii*, *Van Houttei*, *nymphetefolium* and *ornatum* with white and *curseum* with pale pink spathes. *A. crystallinum*, *grande*, *intermedium*, *magnificum*, *regale* and *leuconerum* are foliage types with dark green leaves veined white.

Homalomena (Curmea) Wallisii grows like the low growing *Aglaonema nobile* and the foliage has a dark green median stripe on a yellowish ground but *erubescens* and *aromatica* are *Anthurium*-like in appearance.



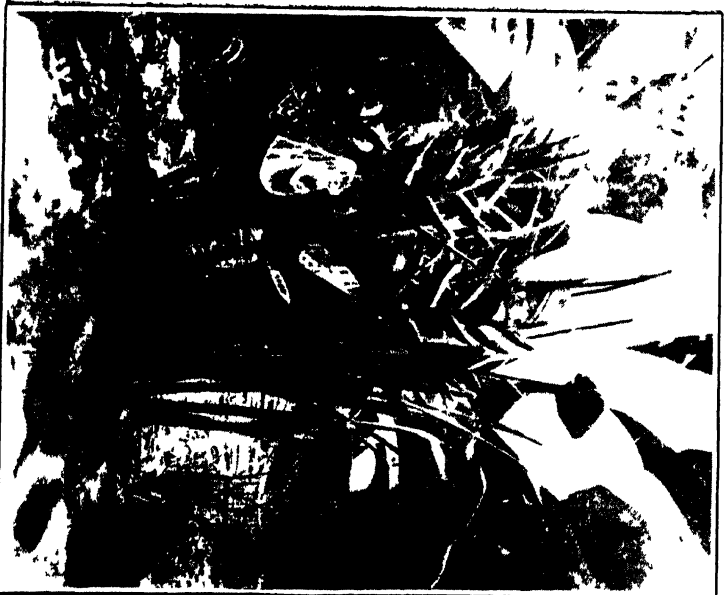
Oxalis Bowen.
(*Page 193.*)



Pontederia (*Eleocharis*) caespites
(*Page 227*)



Alpinia allughas.
(*Page 189.*)



Heliconia brasiliensis.
(*Page 213*)

While touching on the Arum family those who have a large garden should try *Amorphophallus* *Rex*, a gigantic single stemmed plant which shoots up from a large under ground tuber. The flower measures 22 to 24 inches across, a purplish flesh in colour and foetid, followed by a single leaf stalk up to 6 feet in height which then spreads out an umbrella-like much branched structure.

For the Water Garden an Aroid with heavily armed leaf stalk is *Lasia heterophylla*.

Then *Nephtylis picturata* furnishes an ornamental plant 18" high with green leaves feathered cream and together with *Phyllotacnium* (*Xanthosma*) *liudeni* with cream veinings gives us two beautiful fernery plants.

To which botanical family the *Zamioculcas* belongs would prove a puzzle at first glance to most folk till the flower is seen ; two varieties are grown, *Bowinii* and *Loddigisii* both for their curious foliage.

The propagation of Aroids is chiefly done by cutting of the rhizome or stem. *Hocasia*, *Dioscorea* and *Anthurium* are all increased in this way. These are the chief sections of the ornamental Aroids commonly grown.

The next block is usually referred to as Cactus but actually several botanical families are represented.

Agave, the *Century Plant* gives a number of curious types dwarf and tall growing, some with huge thorns and others variegated. *cantala variegata*, *americana variegata* and *americana striata* have striped foliage. Taking the *Eurceia* (*Poinciana*) into consideration which is of similar growth to *Agave*, we can add *gigantea variegata* and *Watsoniana* to the variegated section. Thorny types are *Agave polyacantha*, *torquosa*, *ferax*, *emarginata*, etc.

The *Aloe*, which the Indian calls *Gher* or *Ghita Kumari*, and uses the mucilaginous gummy substance from the leaf medicinally, gives several ornamental forms, *barbatas*, *saponaria*, *Fru*, *Camperi*, etc., the first named bears spikes of pre pinkish tubular flowers several times a year.

Bryophyllum, the *Air Plant* provides an interesting study of the simple method of propagation employed by nature.

A leaf hung up in a shady spot will produce a plant from every notch. Grown for the pretty green and brown Fox-glove like flowers which are borne in January-February.

Cactus proper. These wierd curiosities of plant life are in the majority of cases fiercely armed with thorns and prickles varying in width from needle points to broad hook-like spines. Some are unarmed but corrugated and ridged in curious ways. The *Epiphyllum*, with flattened stems, bears lovely flowers in reds and purples, the *Cereus* are night flowering climbing Cactus mostly with white flowers but a selection of such long named varieties as *Mamillaria*, *Echinocactus*, *Echinocereus*, *Echinopsis* and *Opuntia* should be cultivated by the enthusiast.

On the Hills many glorious flowering types of *Phyllocactus* in reds, purples, orange and white, compel amateurs to attempt their cultivation on the plains, with the usual fatal results. We can only grow one type of *Phyllocactus*, the white *latifrons*. *Cereus triangularis* and *hexagonus* are grown on trees or walls and are night flowering.

Stapelia gigantea, which is grouped with the Cactus, is a class of plant actually far removed from the Cactae. The large starfish-like flowers are a pale yellowish green netted with dull red, very handsome but to be viewed from a distance as the odour is foetid.

Adenium obesum, if not in flower would be passed by at first glance as an uninteresting ugly succulent but is the centre of attraction when bearing its pinkish red Plumeria-like flowers. It blooms right through the hot months and occasionally during the rains, grows in full sunlight but is of slow growth.

Pedilanthus tithymaloides gives us two variegated forms, the green type called the *Jew's bush* or *Slipper plant* because of its shoe-shaped scarlet flowers, is common in the hedges all over Bengal. The ornamental types are blotched cream or white and if cut back will bush out and give a nice bit of colour in a sunny corner of the garden.

Yucca, the *Spanish Bayonet* or *Auda phool*, as the Indian so aptly describes this armed *Aloe*-like plant, is another excellent addition to the succulent rockery; the variety *glariosa* flowers regularly in the rains and is the best to grow.

Sedum sarmentosum, *Stone Crop*, a low growing succulent with small yellow star-shaped flowers, is common on the Hills and on

occasion met with on the plains. It is impatient of salt water but forms a fine edging to a rockery.

Euphorbia. The Milk Worts. These plants are easily placed by the milky exudation which follows the breakage of leaf or stem, all are hardy and can stand the roughest treatment. *triangularis* and *monstrosus* are two foliage types and *Bojeri* a thorny shrub has scarlet flowers. The dwarf Poinsettia-like *heterophylla* with bractial leaves half scarlet and half green is called the *Mexican Fire Plant*. The creamy *variegata*, bearing the appropriate name *Snow on the Mountain* is somewhat less hardy.

The next few plants on this list belong to the Plantain family and require shade for full development and colouring.

Heliconia are like dwarf plantains 4'-6' high. *Brasilensis* has green foliage and a scarlet flower sheath which obtains for it the name of *Lobster Claw*. In *aureo striata* the veinings are yellow, *roseo striata*, deep pink, *metallica* has the entire leaf tinged red but the most brilliantly coloured in the red section is *Edwardus Rex*.

For ornamental foliage both dwarf and tall we must turn to the *Marantas* which though more or less deciduous in the cold season are sufficiently useful right through three quarters of the year to be recommended. For tall kinds pick *arundinacea variegata*, *regalis*, *splendens* and *zebrina*; in the intermediate section *laudemiana*, *asymetrica*, *Veitchii*, while *bella*, *Lowii*, *medio-picta*, *nitida* and *Vanden Hickii* are the best of a large selection of dwarf kinds. *Marantas* like semi-shade and good drainage but any soil will do for them.

Sansevieria, the *Bowstring Hemp*, is often seen in pots and in sunny rockeries. *Zeylanica* is green marbled with grey in transverse bands while the variety *Laurenti* is further ornamented with a creamy yellow margin. Several other varieties are cultivated for curious leaf or flower but not for foliage effect. The *Sansevieria* belong to the lily family.

Let us consider the Pineapple family as a whole embracing *Ananas variegata*, *Billbergia*, *Nidularium*, *Pitcairnia* and *Tillandsia*. All are hardy, nearly all grown for foliage though the *Billbergia* and *Pitcairnia* are pretty flowering plants too. The *Billbergia* and *Nidularium* can be grown on blocks of wood or in the rockery.

Aspidistra lurida variegata, the *Parlour Palm*, is a useful plant with strong green leaves striped with white, able to withstand rough treatment but long ousted from its position in the house, on the plains at least, by the Palm.

The low growing *Luthericum* with their rosettes of green foliage variegated with cream, find a place in ferneries or hanging baskets.

And *Coleus*, how can we describe the wonderful colour effects of these succulent plants! Red in varying shades and yellows predominate. Grown from seed, the best forms can be propagated by cuttings. *Coleus* likes a semi-shady situation and a light rich soil. *thyrsoideus* a green leaved type has bright blue flowers but does best on the hills. *Coleus* cuttings should be made at short intervals as this succulent plant is of quick growth and the old stem becomes "tired" very quickly. No flower spikes should be allowed to open, pinch them off as they appear. A rich compost is much appreciated by the *Coleus* and a return in large foliage thereby secured.

Commelina Sellowiana in flower reminds one of a bright blue butterfly perched on the end of a trailing stem. This plant is marsh loving but grows in any damp shady situation.

Then the *Aster amellus*, *Michaelmas Daisies* they are called, possess a great variety of types. The hardy blue is usually grown and on the plains it spreads rapidly and flowers profusely, delighting in a sunny situation. Several shades of blue, purple and white can be cultivated and are satisfactory in an open border.

Begonias are not found in great variety in amateur's collections. *President Carnot* and *coccinea* are the best known scandent flowering types, the dwarf *semperflorens* in white, pink and red are hardy on the plains so is *reniformis* with white flowers. The well known *Rea* types are the most ornamental but several other variegated leaved kinds are also met with. Good drainage obtained by mixing in a fair percentage of lime rubble in a rich light compost suits the *Begonia*.

Curculigo recurvata variegata is palm-like and very handsome. It sends up runners and soon makes a clump of cream striped foliage which is ornamental in a shady rockery.

In *Cyrtodeira* we have a spreading succulent resembling the *Begonia*, useful in a fernery or in hanging baskets. The form specimen

plants the runners should be pinched off. The variety *metallica* which grows 9"-12" high has dull red foliage and *tesselata* has curious crinkled leaves, both are worth adding to a fernery.

Dorestenia maculata is curious rather than beautiful, the green leaf is wrinkled and blotched with grey and the fruit reminds one of a fig split open.

The grass-like *Dianella nemorosa* has small white flowers succeeded by azure blue berries which last for a long period, as a berried plant this has no equal.

Romecon chinuantha, called the *Poppy of the Dawn* or *Chinese Poppy*, is a low growing quick spreading plant of use in a shady fernery. The foliage, with silvery undersurface, is handsome in itself while the small white flowers add to the beauty of this *Poppy wort*.

On the Hills *Geranium* and *Pelargonium* are very much at home but on the plains a scarlet variety alone can live through the Monsoon. It is advisable to obtain cuttings every October from a Hill Station. A rich soil is a *sine qua non*, remove buds till the plants are strong and growing well, then liquid manure can be given.

There is the well known *Velvet Bush* with the new foliage resembling purple plush, this is called *Gynura aurantiaca*, rather straggling in growth but if cut back it bushes out. *G. lacera* is dwarf and has grey leaves deeply cut, the under surface is purple which further enhances the beauty of the plant.

Then we must refer in passing to the *Transvaal Daisy*, *Gerbera Jamesoni*, with pretty single orange Marguerite-like flowers on long stems, very handsome and excellent as cut flowers. The cultivation of *Gerbera* is quite simple, light rich soil, full sunshine and assistance when showing bud with liquid manure. There is hardly a month when *Gerbera* fails to give flowers, the early hot season giving the best results. Hybrids provide white, yellow, salmon and pink shades.

Gymnostachyum ceylanicum is another excellent fernery plant of low growing habit and finds in the *Ilittonia* a companion plant. *F. argyrocnema* shows the marvelous tracery of nature with white veinings, *Pearcei* has scarlet and *gigantea* dull red veinings completing a trio worth obtaining.

A tender succulent often coddled but really a hardy fernery plant is *Impatiens Sultani*, the *Zanzibar Balsam*; though nothing like the large *Camellia*-flowered type we cultivate in the annual section, *Sultani* is covered with brilliant orange scarlet flowers for many months of the year. Hybrid types have brought in a variety of colour 'tis true from a pale pink to a deep mauve pink but *Sultani* is still the prettiest and best.

The "*Blood Leaf*" as *Iresine* is called, has ornamental red or green foliage with yellow and red veins, of simple culture and growing equally well in sun or shade. Easily propagated by cutting it can be frequently pruned and replanted to give a mass of colour.

Though not very striking in flower, *Isoloma petrea* is a low growing fernery plant 9"-12" high bearing small tubular star-shaped flowers.

We have a very handsome succulent in *Kalanchoe* with ornamental foliage; *Fortunei* further obliges with yellow star-shaped flowers and *Kewensis* with carmine pink, both doing well in semi-shade.

Mirabilis is seldom grown now, the flowers which appear in the afternoon are closed when the sun rises the following day. Called *Gulabas* by the Indian it is perhaps better known to most amateurs as *Four O'Clock*.

We see so much of the Plantain that the very name conjures up a huge trunk and gigantic foliage. In *Musa coccinea* however we have a dwarf, 12" to 3' high with scarlet bracts, *rosea* which grows 8' high is not as brilliant a red. *Sumatrana* and *zebrina* have the foliage blotched with chocolate.

Ophiopogon resembles a grass, its leaves forming tufts of foliage, some varieties being variegated with white others are entirely green; the flowers too are delicately pretty, like miniature lily of the valley.

For hanging baskets and trailers on rockeries *Pellionia* and *Tradescantia (Zebrina) pendula* should be grown. There are several varieties of both. *Pellionia alipurensis* and *pulchra* and *Tradescantia pendula regina* and *aureo striata* being the best.

Peperomia arifolia is *Begonia*-like, the green heart shaped leaves marked with regular lines of silvery grey is very handsome and the plant hardy forming bushy masses of foliage 9 inches high.

Pilea muscosa has been called the *Artillery Plant* because the bursting pollen is discharged in smoke-like puffs. The hardiness of this plant makes it a great favorite for outdoor rockeries and hanging baskets.

Reinwardtia (*Linum*) *trigynum* is an under-shrub with yellow flowers the size of a *Vinca*. The plant is of spreading habit and flowers very profusely in December-January.

Portulacaria afra (*racemosa*) is a dwarf rugged bush with small succulent leaves, grown as a pot plant in dry up-country stations.

Ravenala madagascariensis, called the *Travellers Plantain*, in a small stage is a useful ornament to the fernery but grows into a magnificent specimen of 15 to 18 feet with a fanlike spray of foliage when planted in the open.

In *Sancolobus globosus* we have a fine leaved plant belonging to the *Artemesia* or *Southern Wood* family. Growing to a height of 4' its fine *Asparagus*-like foliage is very ornamental and useful for cutting. It is also kept heavily pruned as an edging. In flower *Sancolobus* is covered with masses of small grey tufts of bloom.

The annual *Salvia splendens*, which by the way can be grown as a perennial, quite overshadows *coccinea* with loose sprays of red. *S. farinacea* has Lavender-like blue flowers while *Pitcheri* is also blue flowered but a deeper shade. *leucantha* which has white flowers with a violet calyx and a silvery undersurface to the foliage is also worth growing.

Scutellaria discolor, whose grey foliage is further ornamented with a purple undersurface, grows low and is of great value in a shady rockery.

Verbena perennis (*tripennatifida*) has mauve and white forms and is grown as a hot weather annual, it is also useful in sunny rockeries as a perennial low growing plant.

The *Vinca*, represented on the Hills by a blue flowered trailing plant, can only be grown with difficulty on the plains but the *rosea* types, the *Madagascar Periwinkle*, in pale mauve, pink, white and white with a scarlet eye, form a useful set to plant in a sunny corner. These *Vinca* are very hardy and perennial but should be replaced every year by the self sown seedlings which spring up all round the plants.

When we speak of Violets (*Viola odorata*) there arises a vision of those large blue flowered types, half the size of Pansies and deliciously scented, but alas, we have to be satisfied with flowers small and insignificant, and hardly any scent as a general rule. Violets require a semi-shady and yet an open situation, add to this a light rich soil and good drainage and you may be sure of success. Grown in baskets they do excellently and also on a raised rockery on the north of a house or under an open tree. Liquid manure when the buds appear helps to increase the number and improve the quality of the flower.

The compost for Violets should be light and rich with one eighth part of wood ashes mixed in, the runners from last years stools being planted out in September about 9-12 inches apart or one to a six inch pot. A fungus attacks the foliage for which a Permanganate of potash spray must be used while for the mealy bug that often infests the plant use a spray, as recommended in which Chapter Five. The Violet should be sheltered during the Monsoon and a good plan is to replace some of the light rich soil in the pots with a clay top dressing as the rains come in. Keep plenty of room between plants and if fungus does not yield to the permanganate treatment destroy stock and bury the soil.

CHAPTER TWENTY-FIVE.

GRASSES AND REEDS.

The value of tall feathery grasses and light bamboos is not generally appreciated by amateurs. Perhaps the reason will be given that bamboos bring snakes, well, snakes do love old uncared for bamboo stumps with holes and hollows in which to shelter but in a small clean clump there is no room for the reptile.

“The foliage of bamboos does not improve leafmould”, I hear you say, yes if large quantities are mixed in, and, “grass will not grow very well in the shade of bamboos”, but the same is true of the environs of other trees as well! Actually there is no reason why these magnificent grasses should be banished from your garden.

How to grow. Any soil suits this class of plant, water logged localities are naturally abhorrent and extremes of temperature affect the growth but the most poverty stricken soil will grow grasses and reeds. In pots make the compost light. When planting do not bury too deep and stake the new growth.

Where to grow.—Sun or shade makes little difference too, any aspect or position will suit the bamboo. Plant during the rains and be certain that the soil is deeply cultivated for all grasses are heavy rooting plants and it is as well to give full play to the root system.

What to grow.—While there are a number of kinds that may find a place in a large garden the amateur need not worry about more than the few noted below.

The best known is perhaps the dwarf bamboo grass, *Apulaha aristata*, which finds a home in pots on so many verandahs. In the ground it becomes 3' high and can be clipped to hedge form or allowed to grow into a natural bush.

The variegated *Danubian Reed*, *Arundo donax versicolor* and *A. metallica* with a bronzy leaf are both handsome grasses. The former runs to green stems if given too much shade and grows 6'-8' high but *metallica* only reaches a height of 4 feet and loves shade. Early in the rains prune out the thin inside stems and

generally lighten the clump. New shoots will give strong growth and provide the best coloured stems.

Among bamboos *Bambusa aurea variegata*, the Golden Bamboo, *nigra*, the Whanghee or Black Bamboo and *siamensis* a light feathery type are the best of the taller kinds. *B. nana*, growing 8'-12' is used for hedges. *Fortunei* and *ruscifolia* are 3' high and excellent subjects for the fern house or semi-shady borders.

Panicum (Oplismenus) variegatum should be used for hanging baskets or in the fernery ; it is a light growing grass with red and white variegated foliage.

The Gardener's Garter, a miniature *Arundo variegata*, growing 12"-15" high is *Phalaris arundinacea var picta* ; this spreads quickly in a fern house or shady nook and should be added to a collection of grasses.

Flowering grasses are represented by *Thyrsanolaena agrostis* which from February to May produces feathery sprays ; in foliage it is like a wide leaved bamboo and grows 8' high.

The Pampas Grass, *Cortadeira (Gynerium) argentea* is a tall grass with lovely plumes of white flower difficult to establish on the plains.

Ischaemum longifolium and *Saccharum arundinaceum* are tall coarse types with white plumes. The flower sprays of *Eragrostis*, a dwarf grass, are used with cut flowers and *Pennisetum longistylum*, a taller kind bears pink bullrush-like flower heads. If this latter variety is cut down at the end of the monsoon, the grass will flower again in the early hot weather. *Andropogon halepensis* is very strong growing and spreading but if kept within bounds will provide lovely sprays nearly all the year round.

Grasses and reeds are easily propagated by division of clumps in the rains. *Pennisetum* and *Eragrostis* are increased by seed.

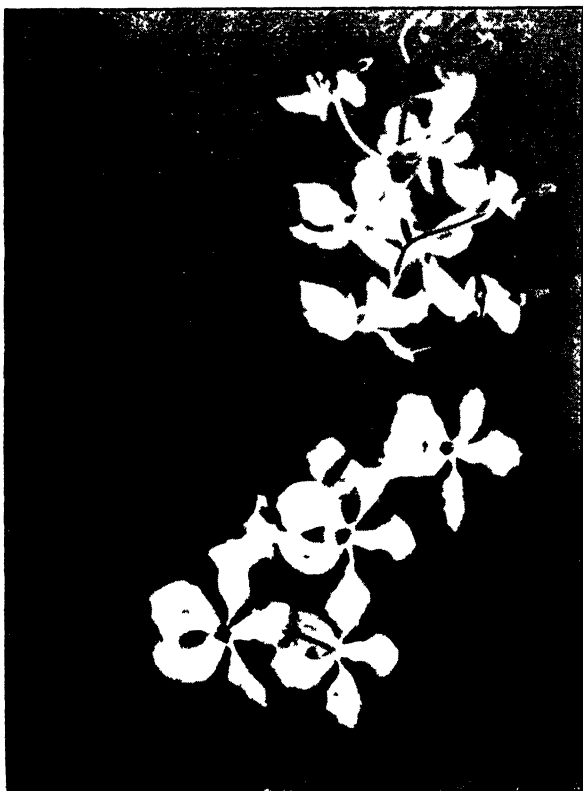


Thyrsanolena acrostis
(Page 220)



Peumietum longistylum
(Page 220)

Aerides odoratum



CHAPTER TWENTY-SIX.

ORCHIDS.

The cultivation of expensive Orchids, such as *Phalaenopsis*, *Oncidium*, *Dendrobium superbiens*, *D. Phalaenopsis*, *D. macrophyllum*, *Saccolabium giganteum*, *Cattleya labiata*, *C. Triuncus*, *C. speciosissima* etc., will of course give excellent results, yet there are many hardy plains and low elevation Hill varieties that can be grown by the amateur with a minimum of trouble.

Where to grow. Orchids do not require too much shade nor yet too much sun and the whole success of orchid growing is to hit on a happy medium. This will be possible if the plants are grown in a fern house lightly thatched; during the hot season additional shade should be given and a daily soaking of the ground to produce a moist atmosphere. In the rains some portion of the covering must be removed otherwise excessive damp will rot the plants.

Orchids may be cultivated under trees provided that the shade is not too dense and the drip from rain not heavy, shelter from the cold north wind must be given and from the rays of the sun on the west. Most Orchids will grow and flower excellently on mangoe trees especially if grown at least five feet from the ground.

You cannot expect an Orchid brought down from an elevation of 5,000 feet to take kindly to temperatures and climatic conditions which exist at a few feet above sea level. If these poor plants are further bound like mummies in coir fibre and placed on a south verandah their end is a foregone conclusion.

Always pick on varieties collected from as low an elevation as possible to suit your climatic conditions.

How to grow. Epiphytic varieties should be grown in shallow well drained earthenware pots, firmly bedding the roots with linkers, burnt brick or charcoal. Moss and peat fibre should be used only during the hot weather and most of it removed as the rains break. Never bury the crown of the plant as this is fatal. If you wish to tie the Orchids on to wood, saw a 2 inch thick teak plank into pieces 8" x 4" and char one side of the wood, then tie the orchid on lightly

with string not wire. These blocks are called "floats". A little moss to assist the new roots to form should always be used.

Terrestrial orchids such as *Phaius Wallichii*, *Cypripedium* of sorts, *Arundina bambusaefolia* and *Thunia alba* are grown in a well drained compost of one third each leafmould or stable manure, garden soil and old mortar or cinders; a top dressing of dry manure or liquid cow manure should be given when the flower spike shows. These orchids will also thrive in the fernery provided they do not receive too much shade.

Remember that Orchids grow during the rains, rest in the cold months and commence sending out flower spikes in December-January, finally bursting into bloom, in most instances, during February-March. The collectors from the Hills supply plants in the cold season and if these are potted off immediately and watched they will bloom the first year. During the dormant period only give a light syringing once a week, when the flower buds show increase the quantity of water but during the hot season water once or even twice a day. If you can give Orchids a moist condition during the growing period the formation of strong pseudo-bulbs and stems will result and this will help toward the flowering growth of the following year.

The reason why orchids fail to flower a second year is nearly always discovered to be a poor root system, in fact many live on the stored nourishment in the pseudo-bulbs and are found to carry dead roots when examined a year after being potted.

What to grow. Epiphytic varieties.—*Vanda teres*, *Parishii*, *coerulea*, *coerulescens*, *Roxburghii*; *Renanthera Inshootiana*; *Aerides roseum*, *affine*, and *odoratum*; *Saccolabium guttatum* and *giganteum* stand a good deal of sun but the *Dendrobiums* on the whole require more shade. In addition to the varieties named above the following are worth growing, *Dendrobium aggregatum*, *Parishii*, *formosum*, *Dalhousianum*, *moschatum*, *Pierardii* and *Cymbidium aloifolium*. These will continue to bloom for several years on the plains but *Vanda coerulea*, *Dendrobium nobile*, *lituiflorum*, *transparentes*, *fimbriatum*, *Wardianum*, *densiflorum* and *Coelogyne* of various kinds will flower well for one year and then might as well be thrown away.

Terrestrial varieties.—*Phaius Wallichii*, *Arundina bambusaefolia*, *Thunia alba*, *Cypripedium Spicerianum*, *insigne*, *bellatulum*, *hirsutissimum*, *venustum*.

For the more advanced amateur with an experienced mali and proper facilities for cultivating imported Orchids the following selection can be recommended.

Cattleya Trianae, *Mossiae*, *speciosissima*, *labiata*, *Skinneri*, *gigas*, *Dowiana*, *intermedia*, *Mendelli*. *Renanthera coccinea*, *moscifera*. *Oncidium ampliatum majus*, *Lanceanum*, *luridum*, *splendidum*, *sphacelatum*. *Epidendrum nemorale*. *Phalaenopsis amabilis*, *grandiflora Schilleriana*. *Spathoglottis plicata*. *Laelia autumnalis*, *purpurata*. *Dendrobium Phalaenopsis*, *P. rar Schroderianum*, *biggibum*, *superbiens*, *superbum (macrophyllum)*. *Saccolabium Harrisonianum*. *Vanda gigantea*, *Batemani*.

These notes apply only to the plains of Bengal, in dry up-country stations the conditions will not permit even the hardiest kinds to thrive, while on the Hills at medium elevations the most delicate will grow without any trouble.

CHAPTER TWENTY-SEVEN.

THE WATER GARDEN.

One can become quite poetic over a restful lake, fringed with graceful aquatics whispering in the wind, the surface covered with beautiful waterlilies, the splash of leaping fish, the tinkle of falling water ; but alas, the serpent in this Garden of Eden is the Mosquito larvae which make any water a risky business unless kept stocked with fish, etc. No pond is sacrosanct but receives its film of kerosene and under such conditions no aquatics can thrive.

If a Water Garden can be provided without unnecessary risk, the following plants can be grown in and around the pond.

How to grow. If a cement tank is utilised build the corners carefully, round them off using cement mortar for this is where half the leakage takes place. A ten inch retaining wall is enough but it must have buttresses into the surrounding soil.

Natural water can be improved by irregular banks and graceful sloping sides. There should never be less than 18" of soil in a tank for waterlilies, shallow rooting types are satisfied with less on a natural earth bottom but it is better to err on the safe side.

Running water has naturally a more ornamental effect than a silent pool and if a cascade or water-fall can be arranged, a rustic bridge added, artificiality is reduced.

Soil. For the soil in which water plants are expected to grow use heavy virgin soil, cow manure and a small quantity of bone meal added at the spot where waterlilies are planted.

For swamp planting use pot plants in preference to those lifted from the ground for the reason that pot plants have their full complement of roots and can assimilate the nutriment and feed the plant. Cut roots have to heal before they can actually enter upon their duties and while a plant may keep alive in water it will not grow till new roots have formed.

Manure is seldom necessary for water plants, a teaspoonful of bone meal or such slow acting material can be dug in once a year.

Where to grow. Certain varieties thrive in swampy land provided they have a foot or so of soil above water. Others grow when their roots are continually underwater. With full sunshine a number of trees and shrubs stand swamp conditions where shade would prevent growth altogether.

Near water. With proper drainage and raising the soil so as to prevent the roots of the plant being continually in a strata of wet earth, nearly all the hardy shrubs can be grown around a pond or within a few feet of the waters edge.

Several hardy ferns will grown in swampy soil, just above water level. *Pteris aquilina*, *Asplenium*, *Angiopteris*, *Acrostichum*, *Marsilea*, etc.

The following plants are a miscellaneous lot of marsh loving types, *Acanthus*, *Funkia*, *Heimerocallis*, *Panuratum* (Spider lilies), *Commelina Selloriana*, *Typha angustifolia* (Indian Bullrush), *Crinum aquaticum*, *Alpinia*, *Hedychium*, *Costus speciosus*, *Iris* in variety, *Lasia heterophylla*, *Colocasia*, *Schizocasia*, *Xanthosma*, and *Polygonum*.

The *Tamarix* both tree and bush form, the several types of *Salix* (Weeping Willow), *Barringtonia acutangula*, *B. racemosa* and *Acacia Farnesiana* are trees that will thrive in swamp land.

The following palms and allied plants stand moist conditions very well. *Carludovica*, *Cyclanthus*, *Acanthorrhiza*, *Nipa*, *Areca lutescens*, *Rhapis flabelliformis*.

In the water itself. Water Lilies. A deep tank can grow *Nelumbium* (The Lotus) or *Nymphaea* (Water Lilies); some of the *stellata* type in Bengal thrive in a couple of feet of water, so will the *Marliacea* hybrids of which many beautiful varieties flower freely in India. The *Nymphaea pubescens* type blooms in the cold months while *stellata* are more hot weather varieties.

Water weeds. *Ceratophyllum verticillatum* (Jhangi) has foliage like Asparagus but unless periodically removed will fill the tank completely. Other weeds, none the less beautiful, are :—

Dysophylla verticillata, (Panee-Kola) with large leaves.

Eurale ferox, a little known aquatic, like a water lily.

Limnantherum indicum (Pan Shoole) like a miniature white water lily.

Monochoria hastefolia, blue flowered, similar to the Water Hyacinth.

Oenanthe stolonifera (*Panturasee*) a creeping Aquatic.

Pistia stratiotes (*Tekapana*) *Water Lettuce*.

Pontederia (*Eichhornia*) *crassipes*, (*Water Hyacinth*) with blue flowers.

Hygrophila spinosa (*Tulmakhana*) a pink flowered shrub.

Papyrus antiquorum and *Cyperus alternifolius*, both ornamental grasses, help to make a bit of water interesting and can grow with their roots in water. Several other types *Mariscus*, *Arundo*, *Bamboos*, *Phragmites*, etc., might be also mentioned.

CHAPTER TWENTY-EIGHT.

THE FRUIT GARDEN.

This section of gardening is one in which few amateurs have interest or experience for space in most compounds is limited to a tennis court and a small plot for annuals.

Where fruit trees are found, they usually consist of a Mangoe or a Litchi grown for shade, Papayas near the Kitchen, a Lime and perhaps the useful "Curry leaf" some where in the back ground. A real fruit garden is only possible in the Mofussil where a biggah or two can be spared and profitably devoted to a selection of well-known varieties.

As this chapter may be read by one who has the necessary space at his disposal we cannot dismiss the subject in a few words.

What to grow.—Do not attempt the larger fruit trees unless you are prepared to wait four to six years. Pomelo, Limes, etc., bear fruit in 3 or 4 years, Litchi and Mangoe take six or eight years before a bumper crop can be gathered. They might bear the first year after planting but precocious fruit bearing should not be encouraged. Where seedlings are planted the fruiting period is protracted and one is never certain of obtaining a good type from a seedling unless careful selection has been practised. For instance a seedling Kaghzee lime may have a thick rind and little juice while one propagated by gootie will perpetuate the thin skinned type absolutely true. Always buy from a reliable source as foliage differences cannot be depended on to show quality and type; to discover after eight years that a Langra mangoe bears small acid fruit will be no recompense for having purchased the graft a few annas cheaper.

When to Plant.—The Rainy Season is the safest period of the year but plant imported fruit grafts when they are dormant or deciduous, *i. e.*, November to February.

Soil and planting.—For trees and large growing shrubs the soil question is important, one must make certain that a depth of 4 feet at least is good soil for shrubs and 6 to 8 feet for trees. A

pit should be dug to this depth and at least 3 feet in diameter, re-fill with the excavated earth to which add a basket of leafmould, one of old rotted cow manure and sufficient sand to counteract any clay tendencies that may exist and to make the compost porous. Ram the mixture down and if possible water it to make the compost sink.

When planting grafts see that point of union is half below ground. All other plants should have the ball of earth covering the roots buried only a couple of inches below the soil. Follow the usual instructions as regards after care; stake and provide a gabion if there is any fear of damage by straying animals. No further manure is required till the plant is well away when an annual dose of a tablespoonful of bone meal or, if this is not procurable, small quantities of fowl yard manure, old cow or horse dung can be dug in.

It often happens that a careless Nurseryman will bud his Peaches 3' up the stock or graft Mangoes about the same distance above ground. One can hardly bury 3 feet of stem as this would be certain death, so that a strict watch must be kept for any shoots coming up from below the point of union. Buy grafts and buddings which are made low down in the stock.

Watering. Never let a plant shew signs of leaf flagging during the hot months and keep it growing strongly till of an age to fruit. Then stop watering altogether at the end of November, allow the plant to winter naturally, or artificially according to variety, and wait for the flower to appear. As soon as the petals fall and it is noticed that the fruits have started to set, commence watering and also give liquid manure in small doses. This applies particularly to the bush and dwarf tree types.

Distance apart to plant. As a general rule shrubs should be planted from 9 to 12 feet apart, dwarf trees 15' to 18' and trees 20' to 30'.

After Treatment. While a tree is bearing well do not prune, merely clean out dead branches and help when wintering with small quantities of manure. Bone Meal 2 ozs., Nitrate of Potash, 3 ozs., Sulphate of Ammonia 8 ozs., Superphosphate 3 ozs., Blood Meal 8 ozs. Give half a pound per tree from the first to the third year, increase to 2 lbs. from the 4th to the 8th years and after the 10th year give 5 lbs. Dig in the manure 3 feet away from the trunk.

Pests and Diseases. Gumming in fruit trees is usually caused by a fungus but often poor soil and bad drainage are to blame. Aerate the soil, cut off diseased parts and paint the exposed weeping surface with a carbolic solution or tar.

Diseases in fruit trees are also brought about by over cropping, excessive moisture or heat.

Malformations are due to natural causes over which one has little control, Galls might be caused by the bite of an insect, in any case sever the branch below the affected portion.

A serious pest, which is difficult to combat, is the "hopper" whose presence is advertised by a black varnish-like substance which exudes from the places punctured by the insect. The Mangoe is chiefly affected and though syringing is the remedy it is almost impossible in most instances owing to the height of the trees.

Fruit trees also suffer from a number of insect and fungus attacks which are peculiar to that fruit alone. Reference to Chapter V will suggest a remedy.

The splitting of stone fruit is often due to improper fertilisation and occurs in early fruiting varieties. Lime is an excellent help for all stone fruit.

Fruit Bats. These creatures, often called Flying Foxes, are very destructive and can only be kept away by netting the tree or hanging kerosene tins with clappers to be pulled at frequent intervals during the night. With nasty neighbours suffering from insomnia it would be as well not to be too noisy.

Birds. Parrots, crows and several other kinds of birds are destructive to ripening fruit but it is only when their depredations become too frequent or severe, that steps are taken to destroy or scare them. Frightening vocally or with a gun are the usual methods employed.

Monkeys. The lungur and small monkey are responsible for the entire destruction of fruit in certain localities eating even Papaya leaves on occasion. Fly paper, bombs, or peppering with small shot may be tried but the amateur would do well to remember that the monkey is a sacred animal in parts of India and killing one might result in a serious disturbance of the peace.

Squirrels. The rat trap or poisoned bait has to be used to get rid of squirrels for even if enclosed in wire netting these animals will somehow get at fruit. Rats are in the same category and sometimes civet or fruit cats become a nuisance and have to be dealt with.

Local conditions produce insects or animals which develop into a menace but usually not serious enough to ruin a crop.

Ripening Fruit. Fruit are often forced ripe by being wrapped in straw, damp grass, etc., but if the fruit is not mature it will colour and soften but remain astringent or acid. Whatever ripens naturally on the tree will be finer flavoured than artificially ripened fruit. Certain pests necessitate the removal of half ripened fruit if we wish to enjoy any return from the fruit garden.

Plantains should be cut as the deep green of the fruit commences to change to a paler shade, hang the bunch stem downwards to obtain slow ripening. Other varieties of fruit which can be collected with a stem should be thus gathered and hung.

Storing fruit. The reason for storing fruit is to carry forward the season of supply longer than nature normally arranges for on the plant itself.

With a refrigerator or cold storage plant fruit can be stored indefinitely but for the ordinary amateur this is not possible.

In the first place collect perfectly mature fruit unbruised and free from disease. Wash such fruit as Apples, Plums etc., in a disinfecting fluid such as formalin to destroy spores of fungus etc., dry and lay on wooden trays in a cool dry room. These trays should rest on racks to allow a free passage of air. Do not let the fruit touch each other. Turn every few days removing such as show signs of deterioration or disease. It is impossible to say how long fruit will last perfectly fresh for humidity and temperature play a great part.

Never pack or store fruit in pine sawdust or any other material containing turpentine as the fruit gets a bad flavour and ripens unduly.

Use a 2% solution of formaldehyde with sufficient soda to neutralise the acid. Dip undamaged fruit in this and dry. Always wash the fruit before use,



Phaius Wallichii.
(*Page 222.*)



Vanda Roxburghii.
(*Page 222.*)



Phalaenopsis Schilleriana.
(Page 223.)

Failure to fruit. This is often due to the stigma of the flower receiving little or no pollen. Where the sexes are on different trees the male variety may be missing or fog may damp the pollen as is often the case with the mangoes.

Failure to obtain fruit may be due to the plants being sterile to their own pollen, if this is the case another variety must be introduced to do the needful.

Sometimes the absence of insects, which play a great part in pollination, is the cause or on occasion excessive vegetative vigor. At times disease and consequent lack of vigor or unfavourable weather conditions are responsible but failure to bear fruit is a serious problem which cannot be ignored. Local seasonal conditions may cause a temporary failure but should a repetition occur a second year it would be as well to investigate or obtain professional advice.

Plains. The following is a selection of the better known varieties for cultivation on the plains. The common name by which the fruit is known is given first, the vernacular being in brackets.

Ashpul. *Nephelium longanum.* (*Ashpul*) is a round, grey, smooth-skinned fruit similar to the Litchi but somewhat indifferently flavoured and does not succeed above 1,000 feet elevation. Seedlings are usually grown and fruit in 8 years but grafts of the large fruited type will bear in 4-5 years.

Bael. Bengal Quince. *Aegle marmelos.* (*Bael*) the large thin skinned type is the best, usually propagated by seed so be certain of the source of supply, seedlings bear in 6-8 years. This is a tree suitable for large gardens, grows up to an elevation of 3,000 feet and bears in April-May.

Bullocks Heart. *Anona reticulata.* (*Non-ata*). Obtain the *Society's Hybrid* which is less "sandy" than the type and bears profusely, no special treatment required but the tree is more suitable for a large garden than a small one. This *Anona* will thrive up to 2,000 feet. Crop ripens from August to December. A basket of old cow manure and lime rubbish as well as a teaspoonful of bone meal should be given every winter.

Carounda. *Carissa carandas.* (*Karamcha, Karundha*). A thorny shrub propagated by seed or gootie, requires no special treatment. The ornamental berries are made into jelly, preserve or pickle

but not cultivated to any extent. Grows up to an elevation of 2,000 feet and fruits from May-August. The plant come into bearing in 3 to 4 years from seed or 2 years from gootie.

Cocoanut. *Cocos nucifera* (*Narial*). The Cocoanut hardly requires an introduction in Bengal ; pick on a well known type, *Bamon white* or *Bamon red*, *Ceylon*, or one of the good Bengal types which are very hardy. Plant nuts in a nursery in January-April and transfer to permanent holes which should be dug 3 feet deep and heavily manured, 9 to 12 months later when the first shoot shows. Give an annual mulch in June of rotten fish or cow manure, etc., a basket per plant, as well as a seer of salt and one pound of Bone Meal.

The Cocoanut will fruit in six to eight years, succeeds up to 1,000 feet elevation but does not thrive very well away from the sea coast. *King Coconut*, *Hazari* (thousand fruited) or genuine varieties that will fruit in 3 to 5 years are difficult to obtain.

Custard Apple. *Anona squamosa*. (*Ala. Sareefa*). Obtain the "Mammoth" a very large fruited variety, this is grown from seedlings and fruits in 4-6 years. Any soil suits these trees. Squirrels are very destructive so the fruit should be netted when about the size of a small apple. Will thrive up to 2000'.

Fig. *Ficus carica*. (*Domur. Anjir*). The fig is insipid in Lower Bengal but the full flavour can be obtained in a dry climate. Do not grow *Roxburghii*, a huge, coarse, large, leaved variety misnamed the Smryna Fig, but any of the *carica* type, *Black Tschia*, *Green* or *Brown Turkey* for instance. Dig around the roots in autumn and winter as other fruit trees are done. Bone meal in small quantities is of great help to the Fig and improves the flavour also add a handful of Crushed Limestone. Thin out extra shoots reserving short jointed growth, water in warm weather to prevent fall of fruit. Fruit borne in 2-3 years, ripens in May-June and grows well up to an elevation of 3,000 feet.

Governor Plum. Black Plum or Jumbul tree. *Eugenia jambolana*. (*Kalajam*) with an astringent dark purple pulp, has to be prepared for the table by being beaten up with salt, fruit ripens in May-June. Obtain the large fruited variety called *Pherenda*. Grows and fruits well up to an elevation of 1,000 feet.

Grape fruit. (*Citrus decumana* variety) is a type of Pomelo but not cultivated to any extent in India yet. Grafted or budded

plants bear in 6 years, fruiting from October to January. Treat just like the Pomelo.

Grape Vine. *Vitis vinifera.* (*Angoor*) though it grows luxuriantly on the plains the Grape Vine seldom gives sweet fruit. On the pruning and cultivation of the Grape depends the production of good bunches of fruit. When the plant is deciduous it should be carefully pruned, all thin twigs being cut out and long shoots headed back. It is a good plan to have shoots cut so that the new growth, when produced, will grow outward. Cut back laterals to 2 buds, shorten leaders to 18" or less when growth starts in Spring. Water carefully and manure with blood, fish or bone meal at the rate of 1 lb. per plant. Water when the fruit sets. Plants should be set 8 feet apart and will bear in 3 years. The Grape grows well up to an elevation of 5,000 feet and fruits from March to October according to locality and elevation. Grow *Muscat of Alexandria*, *Bedana*, *Black Hamburg*, *Moore's Early*, *Hussaini*, *Sharbati* and *Rose*.

Guava. *Psidium Guajava.* (*Umrud. Peara*). Some types are pear shaped, others round. The *Benares*, which is a round variety about the size of a tennis ball, has seed that can be chewed while the *Seedless* is perfectly safe but not of very first class flavour. The red fleshed types are also nice and *Allahabad white* a well known variety of fine flavour. Always obtain a graft or gootie for seedlings usually produce very heavily seeded fruit and are never true to type. Guava jelly, cheese and stew are methods of using this fruit when it is not eaten "out of hand". Owing to the fear of apendicitis you will find many Europeans avoiding this fruit.

The *Catley* or *Strawberry Guava* is more or less a curiosity but the bush *guineensis*, which has a luscious acid pulp instead of flesh, is worth growing. Guavas want little care, bone meal gives flavour and strength of course but the plants are usually grown on the most ordinary of soils. The guava is a dwarf tree and grows up to an elevation of 3,000 feet, bearing fruit twice a year in July-August and again in November-December.

Pests. The fruit is destroyed in the same way as the Pomegranate by a caterpillar and the stem of the tree is also bored by a caterpillar which should be harpooned. These are about the only two diseases of the Guava.

Indian Plum. *Ziziphus jujuba*. (*Baer* or *Narkuli Kul*) is a great favorite among the Indians and also appreciated by Europeans who have acquired the taste for the fruit. Here again a good heavy fleshed type should be chosen and as these plants are budded or grafted a right kind can easily be procured which will fruit in 2 years. The round plums are of several varieties, some acid others sweet, and are usually grown from seedlings which bear in 4-6 years. Keep the plant within bounds by the removal of overlapping branches but no special treatment is required to obtain results; old cow manure helps the crop. The Plum thrives up to an elevation of 2,000 feet, ripening its fruit in February-March.

Jak. *Artocarpus integrifolia*. (*Kuthal*). Liked by very few Europeans because of its strong odour when ripe. Properly cooked when unripe, the flakes make a fine curry while the roasted seed resemble chestnuts. There are several types, some with hard flakes, others going to a mash when ripe. The tree is of large proportions only suitable for a large garden, grows well up to an elevation of 1,000 feet, fruits in May-June and propagated by seedlings which bear in 8-10 years.

Lemon. *Citrus Limonium*. (*Gorah nimbu*), there are a number of *Malta* or *Lisbon* varieties to pick from, a long fruited, thin skinned, scented variety is the best, here again pick on thin skinned types. A teaspoonful of Bone meal and a seer of lime rubbish per plant given in the winter is of great help. Thin out interlaced branches and keep the centre of the bush open. Can be cultivated up to an elevation of 5,000 feet.

Lime. *Citrus acida*. (*Nimbu*) is easily grown. For a good lime choose *Kaghzee* and *Patee* from selected thin skinned strains because some types have thick skins and little juice. *Jumberi*, known as the *Sour Orange*, is also an excellent variety for limeades, etc. Grows well up to an elevation of 5,000 feet.

Pests. The *Citrus* caterpillar on the foliage of the lime or lemon is quite simple to pick off, a borer in the trunk is also easily removed by pruning but is usually discovered when the branch has been fatally damaged. Splitting of fruit is often due to a want of potash in the manure but may be caused by a fungus. A seer of Crushed Limestone per plant added to the soil is very effective.

Litchi. *Nephelium Litchi.* (*Lichu*). If you can save your fruit from birds, beasts and the genus Homo, it is well worth growing a tree but then only in a large garden is it possible to get good results. *McLean's, Rosa Scented* or *Mozufferpore* are the best, the *Japanese varieties No maicha* etc., are late bearing and poor in quality.

When the tree commences fruiting give annual doses of cow manure, bone meal and lime, 5 seers in all and after wintering, water the tree copiously as the fruits form. The Litchi fruits up to an elevation of 3,000 feet in May-June. Plants which are propagated by gooties bear in 4-5 years.

Litchi rust is the one serious disease of this plant, on the first signs of the leaves curling up and becoming thick and brown, remove the small branches effected and burn.

Loquat. *Eriobotrya japonica.* (*Lakut*), a tree that bears well all over India up to an elevation of 3,000 feet. Here again one must be careful of the type purchased for some have a large seed and little flesh. The flowers are very sweetly scented. No particular advice necessary to grow this fruit which ripens in March-April. Propagated by gooties which bear in 4 years. Seedlings take 8 to 10 years.

Malay Apple. *Eugenia malaccensis* (*Malaya Jam*), resembles the Jamrool in quantity of flesh, is a deep maroon red in colour when ripe and bears nice flavoured fruits from May-July. Seedlings fruit in 8-10 years, gooties in 3 years; often bears in November-December again, but it only fruits up to an elevation of 1,000 feet.

Mangoe. *Mangifera indica.* (*Am.*) Quite a long chapter could be written on the Mangoe for there are some 700 varieties of all shapes and sizes. A selection of 25 of the best for general cultivation is only mentioned. The letters signify from which Province the varieties originally came. The selection I am certain will not be accepted in many provinces owing to the fact that differences of rainfall, etc., are a deciding factor.

It is difficult to distinguish a good fruit even from its shape and colour as so many seedling forms have been introduced by careless and fraudulent fruit growers that identical shaped mangoes will be absolutely different in flavour.

B. Bengal. D. Durbhunga. S. Upper India. M. Madras.
 A. Bombay. T. Murshidabad.

<i>Alphonse.</i>	A.	<i>Hemsagar.</i>	B.
<i>Bangalooru.</i>	M.	<i>Kisenbogh.</i>	B.
<i>Badamee.</i>	M.	<i>Langru</i>	S.
<i>Banginapalle.</i>	M.	<i>Mulgoba.</i>	M.
<i>Bhuto Bombay.</i>	B.	<i>Nadusali.</i>	M.
<i>Bimli.</i>	T.	<i>Nawab Pasund.</i>	T.
<i>Bombay</i>	A.	<i>Peter Pasund.</i>	M.
<i>Brindaboni.</i>	T.	<i>Pyrie.</i>	T.
<i>Cowasji Patel.</i>	A.	<i>Sarir Khas.</i>	B.
<i>Dilpasund.</i>	S.	<i>Shahabuddin.</i>	A.
<i>Fusli.</i>	T.	<i>Sofaida.</i>	S.
<i>Gopal Bhog.</i>	B.	<i>White Rose.</i>	M.
<i>Golap Khas.</i>	B.		

Among the ornamental varieties which are not of delicate flavour the *Sindoorea* class comes first with scarlet and yellow fruit and *Janakdanprasad*, entirely scarlet, should also be mentioned.

The Mangoe is almost an evergreen and when the leaves fall entirely it is usually a sign that very few flower spikes will form that year. Grafted varieties are dwarfer in growth and branch more than seedlings which form a straight trunk and are taller growing. The Mangoe flowers in January-February but *Dophallia* and *Baramashia*, which have two and three crops of flower, bear again in June-July. Fog often interferes with the bursting pollen and is a serious menace to the crop some years and the lighting of smudge-fires is recommended to disperse the fog in a Mangoe garden. Any grass and rubbish will do.

Mangoe fruit is usually on the market from May to July but with *Dophallia*, *Bhadaurea*, *Fusli* (late) and some of the early types, fruit of one kind or another can be placed on the table right through the year.

To force fruit to ripen, mature mangoes are carefully picked from the tree without allowing them to be bruised and packed into a chatty or box between layers of *Debdaru* (*Polyalthia longifolia*) or *Ash sheora* (*Glycosmis pentaphylla*) leaves. To hasten ripening a little incense (*Dhuna*) is lit in an earthenware saucer, placed in the chatty and the cover then sealed with clay.

Soil. Any soil will suit the Mangoe but a dry well drained one is best. At elevations up to 3,000 feet the Mangoe will fruit and even at 5,000 feet it has been known to grow and bear in sheltered situations.

Manuring. When young give annually in December two to three baskets of well rotted cow dung or one basket of rotted oil cake with a table spoonful of Bone Meal. When first bearing 5 seers of Bone meal should be given which can be increased to 20 seers when the tree is fully grown. Fish manure in similar quantities (5 seers to 20 seers) is also very good while 3-5 seers of salt per tree in September has the effect of reducing leaf growth. Grafted plants bear in 3-5 years, seedlings in 8-10 years.

Pruning is only occasionally resorted to and root pruning when a seedling tree refuses to bear after the 6th year. Slashing the trunk is a method employed by the Filipinos to produce fruit, this is done in the dry season but not severely. In pruning only dead wood should be cut out and the centre of the tree kept open.

The Indian Mistletoe, *Moula* or *Banda*, saps the strength of a mangoe tree and spreads rapidly, it should be removed on sight during the cold weather when the masses of foliage and red flower makes it noticeable.

Larvae of the tiger moth and other kinds bore holes in the trunk or eat tunnels just below the bark, these can easily be harpooned. The beetle which eats off the young leaf, the white ant on the bark and the scaly bug are minor pests which do little damage and are usually ignored entirely.

Mulberry. *Morus alba, nigra, indica.* (*Toot. Shalut.*) There are several types of fruit, long white and long black being the best but a black "dumpy" fruit is also excellent and very prolific. Small reddish black and white types have little value for eating being acid or insipid. These trees require no care or attention; once planted they will grow and fruit regularly. Only the matted growth should be cut each December. This fruit tree grows up to an elevation of 5,000 feet and is propagated by seeds or cuttings, bearing in 4 to 6 years from seed and 2 years from cutting. Fruit borne during April-May.

Orange. *Citrus aurantium.* (*Narangi. Kamla nambu*) do not give satisfactory results in Lower Bengal. The cultivation of this fruit

is most successfully carried out from 1,000 to 4,000 feet elevation and Nagpur and other centres are well known.

Numbers of kinds bear, and bear profusely, but lack flavour or are acid. *Musembe, Sylhet, Kumla* and *Nagpur*, this last gives two crops a year, are worth growing on the plains. On the Hills *Malta Blood, Washington Navel, Golden Nugget, Ruby Blood, St. Michael* and *Mandarin* are a few that one can suggest. Fruit are borne from September to December and, in the case of *Nagpur*, again in April and May. Grafted, budded or grafted plants should bear in 3 to 4 years, seedlings take 8 to 10 years and are seldom true to type.

Papaya. *Carica papaya*. (*Papeeta*) A simple plant to grow, seed of the *Ceylon, Ranchi*, or some good strain is recommended. Sow seeds in pots or direct in ground, 3 to a plot 4' in diameter. On reaching a height of 3 feet remove two seedlings keep one or two "males" to the plantation. The so called "male" Papaya bears small fruit on long stems. The soil for Papaya should be rich and light and if liquid manure is given when the fruit sets it will improve the flavour; Oil Cake, Nitrate of soda or Farmyard manure in small quantities are excellent. Thin out fruit and protect with wire netting against squirrels and birds. This is an ideal fruit tree for small gardens coming to maturity in 9 to 12 months and bearing well for 3 years. Can be grown up to an elevation of 3,000 feet. Often bears two crops a year. Propagated by seed, though cleft grafting of good types is occasionally practised.

Peach. *Amygdalus (Prunus) persica*. (*Aroo*). Grafted or budded plants give certain results in 2-3 years, seedlings from good selected fruit are slower taking 4-6 years to bear. For low elevations and plains grow early fruiting kinds, *i.e.*, *China flat, Nickels large, Agra, Hardui, Saharanpur* or some such acclimatised variety. For the Hills the following are the best, *Royal George, Early York, Early Rivers, Duke of York, Ellerta, Prince of Wales*. Fruit ripen in May-June on the plains but on the Hills from August to October. Early rains are liable to damage fruit therefore the earliest fruiting types are recommended. This tree responds to pruning which should be done when the leaves fall in November-December. Reduce about a third of the new growth especially all inside stems. Remember the Peach bears on one year stems and these should be shortened back to 6-8 buds.



Bauhinia Galpini.
(*Page 128.*)



Peltophorum ferrugineum.
(*Page 161.*)



Dendrobium Phalaenopsis var : *Schroderianum*.
(*Page 293.*)



Bombax malabarica.
(*Page 157.*)

Winter artificially and prune back if grown in bush form and extra fine fruit are wanted. Usually the plant is allowed to grow on its own as a dwarf tree. When fruit are the size of a marble reduce numbers. Give a table-spoonful of Bone Meal to a basket of old Cow Manure after wintering.

The splitting of Peach stones is sometimes due to a fungus disease, often however drainage and sour soil is the cause. Give lime, phosphates and potash and see that Bone Meal is in the mixture. Fluctuations of temperature are also responsible for this trouble. For gumming wash the affected parts with a 1% solution of salicylic acid.

If fruit fails to set try root pruning and give Bone Meal and Lime.

Phalsa. *Grewia asiatica.* (*Phalsa*) A tree with small cherry-like fruits which are eaten when ripe or more often made into a sherbet. No particular care or attention is required to grow this tree; by pruning the plant is kept down and the fruit, which are borne on the new growth, are larger and easily reached. This plant grows up to an elevation of 2,000 feet and ripens its fruit from June to August.

Pineapple. *Ananas sativa.* (*Ananas*). *The Queen, Kew, Cayenne* and other imported types are very fine. Grown from suckers, stumps, side shoots or tops the Pineapple will bear in 2-3 years. Plant at the end of the rains on well drained deeply dug soil or ridges, 2' apart and feed up with manure. After the 2nd year or earlier, if growth has been vigorous, starve from the end of November till the flower head appears about March, then water well. Stake the fruit as it commences to swell and when it becomes yellow remove and ripen it indoors. The *Country* variety, though hard and fibrous, can be turned into preserves, etc. Use potash manures for the Pineapple.

This plant can be grown in full sun or semi-shade and loves the shade of bamboos. Any soil is suitable and it will bear up to an elevation of 5,000 feet. Fruit borne from July to October.

Plantain. Banana *Musa Cavendishii* and *sapientum.* (*Kela*) Grow *Chini Ohampa, Martaban, Kanai Bansi, Cavendeshii (Cabulli) Beet Jaba (red) and Amrithosagar.*

These are six of the best but dozens of varieties are advertised. Plantains will grow in any soil but must not be attempted in shade.

Dig deep and plant firmly. A heavy clay suits the Plantain and "pank" (black earth from the bottom of a tank composed of rotted vegetable matter) is excellent manure. When the flower spike shows, stake or support with shear-legs and after the flower bud has reach a stage when no more fruit from, cut it off. The removal of the drupe the moment the first fingers show signs of ripening is recommended. Fruit borne in 18 months from planting. The Plantain is found up to 5,000 feet and fruits at all times of the year having no set season. Replant clumps every 2 or 3 years in fresh soil.

One of the greatest causes of Plantain disease is the failure to remove the old root when a drupa has been cut and the stem is cut down; the old root often left in the ground, rots in the soil and introduces a fungus disease which makes the Plantain form a rosette of leaves. If this happens destroy the old plants and restart the plantation in new soil. Plantain stems sometimes get attacked by a beetle. The only safe method of eradication is to cut down the stems and burn them. Fork up the soil especially round the base of the clump, keep it cultivated and do not allow weeds on the soil. Fruits on rare occasions are attacked by maggots.

What is the difference between Plantain and Banana? Our table varieties are all Bananas which we wrongly call Plantains. The real Plantain is Kachikela, the cooking type, botanically called *M. paradisiaca*.

Pomelo. *Citrus decumana*. (*Batavi nimbun*, *Chahotra*). There are a number of very indifferent kinds in the market. But *Stalkarts*, a pale salmony pink shade is very luscious and prolific and *Society's No. 1*, a pale pink, another good variety. The deep red flesh type is apt to be coarse and dry, while most white types are often acid, *Society's No. 3*, a white fleshed variety, however is very sweet and delicious.

Gootied Pomelo bear fruit in 3 years but do not let them flower any earlier than this as it will weaken the plant. The same soil as recommended for other fruit trees does for the Pomelo. The first. November after flowering winter the trees, giving a basket of cow manure, a tablespoonful of Bone Meal and a handful of salt per plant, repeat this annually increasing the Bone meal to half a pound. Reduce the number of fruit borne and thin out interlaced twigs.

The Pomelo, though a tree, is suitable for a small garden. It thrives up to an elevation of 5,000 feet. The fruit ripens from July-November. Plants should be grown from gooties.

Pomegranate. *Punica granatum.* (*Anar. Dalim*). This is rather a disappointing fruit, so many hard seeds covered with a thin layer of pulp does not appeal to many people. *Beilana*, which has larger and more juicy seed coats can be easily cultivated but does poorly on the plains. Propagated by cutting or gooties, it bears in 3 years, while seedlings take 6-8 years and are never to be depended on. The only serious pest of the Pomegranate is a caterpillar which eats out the fruit and, before forming a chrysalis, spins a web round the base of the fruit uniting it to the stem. Discovery takes place when the fruit shrivels but does not fall. Watch for a small blue butterfly at the flowering season and bag your flowers. This tall shrub grows up to an elevation of 5,000 feet and ripens its fruit in August-September.

Rose Apple. *Eugenia jambos* (*Golab jam*), although it has only a small quantity of flesh around a large seed this has quite a nice flavour. Fruits in February-March. A variety which bears twice a year can be obtained. A medium sized tree fruiting up to an elevation of 1,000 feet.

Sapota. Naseberry or Sapodilla. *Achras Sapota.* (*Sapalu*) *Baromashia* (all the year) is a round fruited type and the best to grow. Grafted plants bear in a couple of years, being a tree the Sapota is suitable for large gardens only. No special treatment necessary as the plant is very hardy but protect fruit against birds, etc. Will grow up to an elevation of 2,000 feet.

Strawberry. *Fragaria vesca.* On the plains this fruit has to be cared for too much to warrant general cultivation. Runners of large fruited types bear indifferent fruit for one year and either deteriorate in quality or dies. For pot cultivation use a light rich soil, if burnt earth from a kilu can be obtained add one-third, and grow a single plant in a ten inch pot. When flowers are produced arrange a row of crocks, bracken or pine needles or which the fruit can rest. Give very weak dose of liquid Cow manure or Guano but be careful that the fruit is not wetted. The fruit is borne in April-May.

For ground cultivation plant in good rich soil in an open situation. Put runners in during October to December on the plains

and February to April on the Hills, at a distance of 15' apart. Protect fruit from birds and keep raised on crocks or pine needles.

Sweet Lime. *Citrus limetta* (*Meetha nimbu*) also requires very little attention as it grows in any soil ; the removal of weak interlaced branches and doses of manure help. This shrub grows well up to elevation of 5,000 feet and fruits from August to October.

Wax Apple. *Eugenia javanica alba* (*Jamrool*) has white, watery fruit which is sweet if ripening before heavy rain from March-May. This tree will not bear fruit at elevations of more than 1,000 feet.

Hills. The cultivation of apples, Pears, Appricots, Plums, etc. can be carried out best at elevations from a couple of thousand feet up to 5,000 feet. A great deal of attention and care is not necessary however to obtain good results as is often made out but the correct types and right situation is often at fault where failure is reported.

Conditions. Full sun, a situation facing South or Southwest where the cold north winds cannot nip the plant, is ideal.

Soil. This should be a good loamy mixture and of fair depth. Drainage need not be referred to but plants should never be grown on to sharp as slope as water will carry away the manure.

Season of planting. Plant for preference in the cold weather, November to January, especially those types that are deciduous and are dormant at that time. During the rains they are growing and though they survive a shift often lose a certain period of growth.

Pruning is the great secret of fruit production but this must not be carried out every year. Once a frame work has been built up it is only necessary to keep the weedy and thin growth down.

The natural growth of a variety, the stock on which it is grafted, the soil and general conditions of cultivation all govern pruning. Consider pruning as a necessary evil, a last resort as it were. Admit light and air to the tree but otherwise think twice before using the knife.

Apple. *Pyrus malus* (*Seb Sao.*) Usually a spur bearer but some kinds bear on young wood. Keep main branches thinned out and far apart. Apple, Plum, Pear bear on two year growth therefore some

new wood must be sacrificed. Fruit borne from an elevation of 2,000 to 5,000. On the plains of North India *Bismark* and the *Crab Apple* may be grown. To suggest a selection is very difficult owing to the various types now in cultivation which comprise early, medium and late maturing varieties, besides certain kinds also do not stand heavy rainfall.

Blenheim Orange, Bramley's Pippin, Ribston Pippin, James Grieve and Claygate Pearmaine can be named with perfect safety.

Apricot. *Prunus armeniaca.* (*Zardaloo*). Attend to these plants like Peaches ; being a young wood bearer cut back ill shaped branches and crowded shoots, an annual succession of runner shoots is wanted. This tree grows from an elevation of 3,000 to 5,000 feet. Only the *Cashmere* variety, *Moon Park* and *Hemskirk* bear occasionally on the plains of upper India. Fruit borne May to August.

Blackberry. *Rubus variety,* a fruit which bears sparingly on the plains of India but does well on the Hills ripening berries in May-June, years after planting. Plant 6' apart. Remove all spent wood annually.

The **Nectarine** is a smooth skinned Peach ; the variety *Cabul* bears on the plains upper India very poorly but does well on the Hills. Treat like the Peach.

Passion Fruit. *Passiflora edulis.* Climbers of easy culture requiring no care but sensitive to moisture. Grow on a jaffery or other support, 10' apart and keep growth from becoming too thick by growing half a dozen main stems only from the base. And replace very 4 to 6 years with new seedlings or cutting plants if the type you grow is good. Bears in 3 years from seed.

Peach. (*Aru*) Cut back 2 and 3 year growth leaving one year stems on which fruit is borne, also take away small branches and sickly growth. Form a frame of old wood ; tip long new growth. For varieties see page 240.

Pear. *Pyrus communis* (*Naspati*). Only the *Saul Pear, China* and *Keiffer* do at all well on the plains except in the North India area where *Le Conte* and one or two others can be added to the selection.

On the Hills grow *Williams, Bon Chretien* (*Bartlett*), *Louise, Bonne of Jersey, Beauré Hardy, etc.* Let the soil be on the light

rather than the heavy side. Fruit borne in 6 to 8 years ripening from June to September. Treat like Apples as far as pruning is concerned.

Plum. *Prunus communis*, *bokkarensis* (*Arubokhara*. *Alucha*.)

The *Arubokhara* and *Alucha* type bear on the plains but not in lower Bengal. Certain of the Japanese varieties can also be grown.

On the Hills the English and Japanese varieties such as *Victoria*, *Maynard*, *Satsuma*, *Japanese*, etc, do excellently and ripen from May-July. As Plums bear on both spur and young wood only clean out the centre of the tree, remove all thin twigs and side growth, also reduce old growth. Winter and manure as usual.

Raspberries do where the Blackberry succeeds and should be cut down to ground level as soon as new growth shows up.

Other Fruit Trees. No reference has been made to a number of fruit trees that one reads about in catalogues. Some are not cultivated for the European table, for instance, *Woodapple*, *Tamarind*, *Indian Olive*, *Date*, *Cashew Nut*, *Star apple*, *Otaheite apple*, etc.

Others, such as the *Persimmon*, *Monstera* and *Avocada Pear* are not great favorites or difficult to grow successfully.

On the Hills few grow *Gooseberry*, *Spanish Chestnut*, *Dewberry*, *Quince*, *Walnut* and *Cherry*. For this reason only the most easily cultivated types have been dealt with in this article.

CONCLUSION.

And now we have come to the end of the book and I am half afraid to ask your opinion of the contents.

But this one request I do make.

If you have found the information at all incorrect or vague, if you have succeeded where I mention failure, if you have discovered a surer method of carrying out some job, in fact, if you can make any suggestions about a better way of doing it,—write me and if I can be of further service to you, command me.

Let us consider "*The Amateur in an Indian Garden*" a sympathetic medium of co-operation and together help our readers with the best information available. A Gardener should never be "secretive" about any advice he can give his fellow labourer in the field, unfortunately he usually is.

A long cherished dream has at last been realised but with what labour no one will guess. To start with fifty "tally" books were the original recipients of notes and descriptions and very elaborate description of plants too. These gave place to the ground work of a manual and many sets of manuscript have since been scrapped. The present book has practically been re-written twice and innumerable corrections have followed even while the proofs were in press. Since passing the proofs of the book several ideas have occurred too late to be included, these are pigeon-holed for a second Edition.

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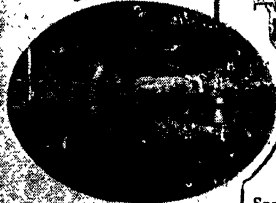
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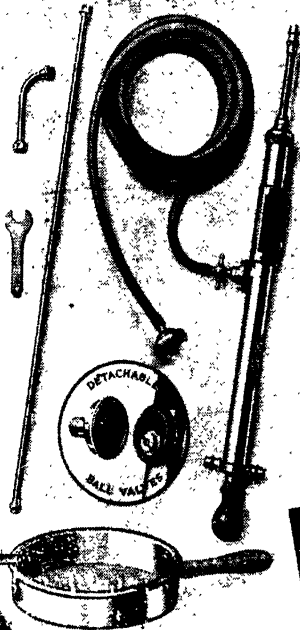
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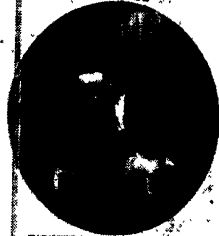
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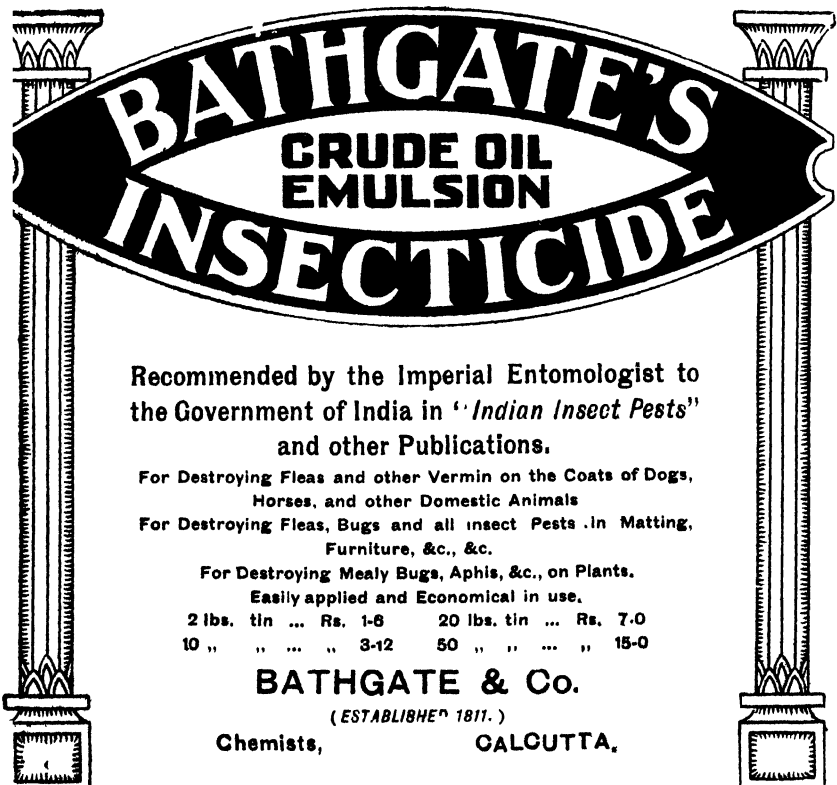
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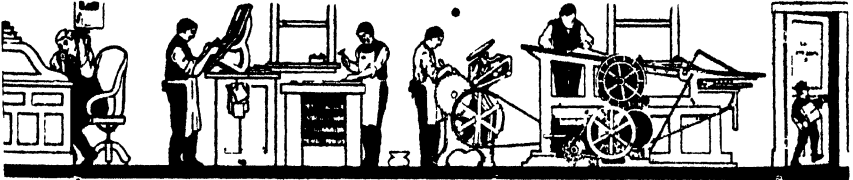
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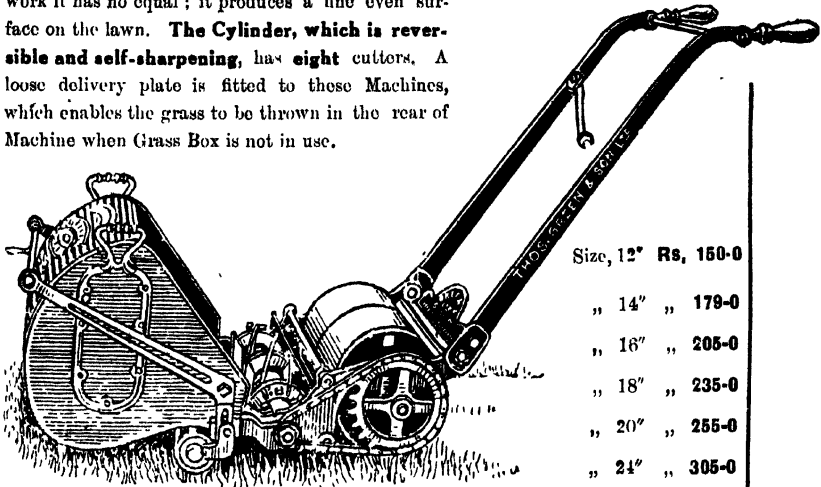
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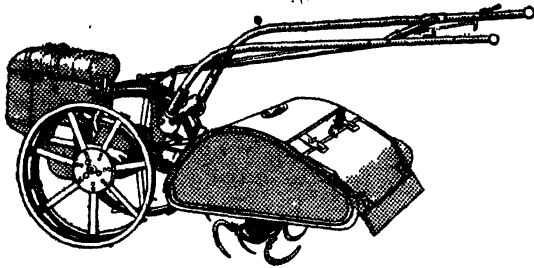
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