ORCHIDS TO ANNA GARREY

This Association and the cause of forestry and horticulture in the state owes a great deal to Mrs. George H. Garrey. For many years she was a member, and part of this time a director, of the original Colorado State Forestry Association and she has been the brains behind much of the recent progress of this association.

Probably her greatest contribution has been her enlisting of just the right persons to fill important positions.

She prefers to keep herself in the background and accomplish her objectives through these selected friends of hers. When no one else is available to do a necessary job, however, she is likely to throw her entire energy for days into doing it. She loves to do the "dishwashing" jobs. Probably the most appropriate title given her by her friends and co-workers is that of "Spark-plug Garrey."

INDOOR PROGRAMS AT HORTICULTURE HOUSE

May 7th, Friday, 7:45 p.m. "The Early Spring Wildflowers," Kodachromes by Harold Roberts.

May 13th, Thursday, 8:00 p.m. Denver Rose Society.

May 14th, Thursday, 7:45 p.m. The New Flower Seeds. By a panel of Denver Seedsmen.

May 19th, Wednesday, 7:45 p.m. Research Group.

May 21st, Friday, 7:45 p.m. Planting and Care of Lawns. James Haines, Denver Country Club.

May 28th, Friday, 7:45 p.m. Arrangements of spring flowers. Mrs. Aileen Fluker.

Denver University Landscape Classes every Tuesday evening at 8:00.

OUTDOOR PROGRAMS

May 1-8. Botanical work trip to southern part of state. Limited.

May 9. Nature trip to Pegmatite Points, conducted by Glenn Gebhardt; 4-8 miles walking distance. Meet at Horticulture House, 8 a.m.


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Williamson's Sapshucker, on Front Cover

Photo courtesy, Rocky Mts. News

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THE ADVANCEMENT OF HORTICULTURE IN COLORADO

"The Public Interest"

As editor and horticulturist these are the principles which have governed our every action. We believe in them, and believe that everyone will profit by working together with these aims in mind. One of the most pleasing things about this work is the opportunity to bring together groups of people to work with others toward the achievement of these principles.

If you believe in this you can show your appreciation by talking to your friends and securing more members for the Association, for the success of the organization depends on the number of citizens who get behind it. If each member who approves of these objectives will enlist his friends it will assure progress of the Association's work without the necessity of a few people contributing large sums, or the great expense of membership campaigns.

The future good that the Association can do towards making the state a better place in which to live depends on you—our members.

GEORGE W. KELLY.
THE WEEK-END GARDENER

THE weather is so nice today that I believe I'll plant some of these seeds I got weeks ago. Even if we do have a little cold weather yet, I'll take a chance on their coming; and if they should be killed a little more seed is inexpensive. For the more important places I think that I will wait a few days and then get plants from the greenhouse. They are not very expensive and will give me bloom weeks earlier.

I paid two dollars for one little shrub yesterday. It seems to me that I could just as well raise my own small plants. I'll ask the Oldtimer if he knows how it is done. "Sure," he says, "you can raise some of your own plants, but many are difficult to propagate and slow to come, so that you would actually spend more time raising a few plants than they would be worth." I guess that maybe the nurseryman earns his money after all. But I remember how my dad used to stick willow limbs in the dirt along the ditch and grew trees. I wonder what the Oldtimer says about that. "Sure," he says, "you can raise willows, poplars and some such things from cuttings; but who wants them after they are raised." He did say, though, that privet and tamarix were easy to start from cuttings, and I do need some of them. He told me that many things were started from seeds, but that all the finer roses, the fruit trees and many other new things were started from grafted plants. He tells me that grafting is a rather particular job, but I'm going to find a book that tells how it is done and see if I can learn to do it. I got a five-in-one apple tree last year, and I'd like to graft another 5 kinds just for fun. I'll probably never be an expert, but I'll know more about plants, and will be pretty proud if I get a few grafts to take. This kind of grafting is more in my line than the kind they tell me the politicians learn to do.

Another method of propagating shrubs, the Oldtimer tells me, is by layering. I need some more small dogwood plants, so I think that I will hill some dirt up around my old dogwood plant and see if some of the limbs will take root. It is sure interesting to learn the various ways that Nature has developed for plants to propagate themselves.

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TREES FOR COLORADO
RECENT concern over the possibility of losing our elm trees because of the Dutch elm disease has focused attention on other good trees which may be planted in place of elm.
The Research Group of the Colorado Forestry & Horticulture Association composed of nursery, landscape and tree men of long experience suggests the following list. This list is arranged according to the number of votes that each tree received. Refer to the January 1948 and July 1949 issues of "The Green Thumb" for descriptions of these trees showing their best uses, outstanding characteristics and disadvantages. No tree is perfect but these are the best species available for use in Colorado. Each should be used in the situation for which it is adapted. The committee invites further suggestions and corrections.

CHAS. C. WILMORE, Chairman
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WM. LUCKING, JR.
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PAUL MORROW
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GEORGE W. KELLY

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American Linden
Silver Maple
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Russiansolvare
Bur Oak
Green Ash
European Mountain Ash
Curtis' Birch
Siberian Elm

The Next 10

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Kentucky Coffeetree
Native Cottonwood
English Elm
Buckeye
Hops Grabapple
Northern Red Oak and
Pin Oak
American Elm
Northern Catalpa
Downy Hawthorn

Others Possible Under Certain Conditions

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Sugar Maple
Norway Maple
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Teeceofheaven
European White Birch
Goldenrain Tree
Russian Mulberry
Polelars
Willows

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Yellowwood
Beech

Goldenchain Laburnum
Ginkgo
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THE DUTCH ELM DISEASE

The picture on the opposite page was taken by Ed Scanlon, editor of "TREES" magazine. It shows rows of stumps left on a street in Columbus, Ohio, after the trees had been killed by the Dutch Elm disease and phloem necrosis. We do not want Denver streets to look like this. Recently the top experts from the Federal Bureau of Entomology, with heads of various state and city departments, spent a week surveying the situation in Denver and the state. Their conclusions are given below.

1. The bark beetles which spread the disease are rather common over much of the city, and the state.

2. The disease has been positively identified in several trees in Denver.

3. It is reasonable to suppose that these large numbers of beetles would soon infect all the American elm trees in Colorado unless measures are taken at once to control their breeding.

These Experts Recommend

1. That all dead or partly dead elm trees, dead limbs in trees, and elm logs in dumps be removed and burned or sprayed with DDT.

2. That special attention be given to the care of American elm trees to increase their vigor to a point where they will not be suitable breeding places for the bark beetles. Emphasis should be on thorough watering, fertilization where needed, and spraying for insect pests, especially the elm scale.

3. That property owners who want to take every precaution to save their trees, secure private tree men to spray their elm with the approved DDT emulsion.

How Can The Beetles and The Disease be Identified?
The Scolytus beetles which carry the Dutch elm disease are tiny brown insects which may emerge from their breeding places in the elm bark around May first and later. They fly to the nearest elm tree and feed there in the smallest crotches for a few days. Then they fly to the nearest weak or recently dead elm wood and bore into the cambium layer and lay their eggs. If they do not find suitable places near by they may fly for miles or attempt to lay their eggs in vigorous trees. When a tree has a full flow of sap it usually drowns out the beetles. Where the beetles find suitable wood they bore a gallery up the tree laying eggs alternately on each side. These eggs hatch, and the larvae bore out at right angles, giving the typical "double-comb" pattern. These larvae may then bore up into the bark and pupate, emerging at the proper time to fly out and complete the cycle. A tree of low vigor may be killed by the beetles themselves as they girdle the tree with their brood galleries, and the beetles may spread the spores of the disease to healthy trees as they fly out to feed.

When a tree has contracted the disease it may begin to die back from the top, with a few lingering live sprouts from the trunk, or it might in rare instances throw off the disease. This is a fungus disease which kills the tree by clogging its circulatory system with the fungus growth. The typical sign of the disease is brown discolored rings in the recent growth, though so far these have not been very conspicuous in specimens found in Colorado. It is impossible to say positively from its appearance whether a tree has the Dutch elm disease or not. Specimens of the wood must be sent to the Government laboratories for culture of the fungus and inspection under high-powered microscopes.
HARDY PLANT MATERIAL FOR HIGH ALTITUDES

MRS. H. E. COMBS, Steamboat Springs, Colo.

IT is a problem to know what to plant in the higher altitudes of Colorado with their short season. Conditions here are such that many things classed as hardy in the nursery catalogs will not thrive, especially among shrubs and trees. By the process of elimination, however, and after 20 years of experimenting, this writer has found a number of things that do well. From a planting of trees obtained from the State Agricultural College we found these that survived: Russian golden willow, Balm of Gilead, Norway poplar, Canadian poplar, Laurel leaf willow, Russian olive, and White ash, the last slower growing than the rest. The silver-leaved poplar lives here and of course we should not forget the possibilities of using the native trees. The Chinese elm is sometimes recommended but our personal experience is that it winter kills each winter, growing up to brush the next summer. A nice lawn tree is crab apple, which most years will make fruit. One of the best of these is the Dolgo crab, which has very sturdy, upright branches so the heavy snow does not injure it, even when small. The Hopa crab is equally hardy and is a beautiful flowering tree, with its deep rose-colored blossoms in the spring and small brilliant red apples later.

The best way to help a young tree through the first few winters, till it develops a heavier bark and can withstand the climate, is to wrap it in winter with burlap. We also find that things propagated in the rigorous climate of the northern states and Canada are more likely to be successful than things grown in a milder climate.

There are a number of shrubs we found to do well. The Tartarian honeysuckle thrives and has both flowers and berries. These berries form a feast for the birds all fall. The Siberian peashrub grows into a tall hedge. Several viburnums do not winterkill at all and have both spring flowers and later fruits. The Highbush cranberry is one of these. It resembles the snowball which, however, winterkills at our altitude of 6800 ft. Viburnum lantana, or nannyberry, and V. dentatum, or arrowwood are tall shrubs which have beautiful fall foliage. Silverberry is a good small shrub with greyish leaves and inconspicuous yellow blossoms that perfume the whole neighborhood. Of the Spireas the Billard variety blooms during summer when no frosts interfere. It thickens up from the roots like a perennial and should be divided and replanted after a few years. The dwarf varieties, Anthony Waterer and Callosa, die back like perennials but come up each spring and bloom all summer. Bridal wreath kills back and stray buds usually get frosted but the Korean spirea is a harder variety that resembles it and blooms later when frosts do not hurt it.

Of course the lilacs are hardy and will usually bloom if planted on the east side of the house or some other protected place. Everyone should have some of the beautiful French hybrids, many of which are double. These come in many shades of lilac called red, pink and blue as well as white and have the advantage of blooming on much younger bushes than the common lilac. It is best to be sure to get French lilacs on their own roots, as the grafted bushes may be on an understock that is not hardy, or an accident to the plant may kill the top so the variety will be lost.

I have used the hybrid Rugosa roses as shrubs or hedge. These grow into good specimen shrubs and have the advantage of blooming from spring until frost, which few shrubs will do. Some are sturdier than others. Among these are Hansa, (red) Belle Poitevine, (deep pink), wild Siberian rugosa, (pink), Sir Thomas Lipton, (white), and Grootendorst, (both red and pink). Others with a more tea rose character are Amelie Graveaux, (crimson), Dr. Echner, (salmon) and many more to be found in nurseries in the northern states. Among the roses the rugosas are the only ones we have found to be permanent, except the briars, such as Hawthorn yellow, Persian yellow and Austrian copper. The new Brownell sub-zero roses look promising and
should be tried out by high altitude gardeners.

Nearly all perennials listed as hardy will be satisfactory, except some that bloom too late in the fall, such as most of the chrysanthemums. The snow in the high altitudes serves as a mulch so the plant material need not be protected with anything else over winter. In fact, some things may suffer under the heavy snow instead of winter killing. Violas, pansies, columbines and ferns thrive in this climate, as well as other plants that usually like the shade. Fall phlox, delphiniums and others grow to surprising heights and luxuriance.

As a class, the hardy spring bulbs are perhaps the best of all. They seem to be especially suited to this climate, to be acclimated and to multiply very fast. All of the narcissus family thrive, as do the tulips, especially the Darwin’s, which are most beautiful and most permanent of the tulips. We have found that the daffodils and other narcissus may be left as much as 5 years without dividing and replanting, and tulips 2 or 3 years. If tulips are left more than this, though, they tend to disappear.

Among the lilies, the Elegans and Umbellatum groups multiply like perennials and bloom in midsummer. The earlier strain of tiger lilies become naturalized. The lovely little Tenuiflorum lilies and Regal lilies seem to be medium hardy but last only for a number of years. Perhaps some evergreen branches over the lily bed in winter might not be a bad idea. Of course day lilies live year after year. The blooming season of some of them is a little too early and the buds get ripped. The same is true of iris so it is well to choose later blooming varieties.

Dahlias freeze so easily they are hardly worth the trouble of protecting for each light frost, but gladiolus foliage withstands some frost and they are very worthwhile. However, one should select early varieties that will have time to bloom before fall freezes and also have time to develop good corms for next season’s bloom. All in all, there are a lot of lovely things that do well without codling.

HOW TIME-LAPSE PLANT PHOTOGRAPHY IS DONE

John Nash Ott, who shows his time-lapse plant pictures here June 17th, is much more than a photographer. Although a banker by profession, he is a good gardener and has shown rare ingenuity in the elaborate machinery which he has developed to make possible his remarkable pictures. In his laboratories in the basement of his home at Winnetka, Illinois, which I visited March 19th, he has a dozen movie cameras at work constantly taking pictures at regular intervals of various subjects. Everything is automatic. Every five or ten or twenty minutes bright lights will flash on, natural light is shuttered and the proper camera will click on. The cameras are mounted on tiny tracks and are arranged to move back and point up automatically as a plant grows. He may be photographing the growth of garden peas, or the emergence of the shoots of wild heppatica, or the effects of various treatments on seed corn; the plant growth which takes weeks will be photographed so that it can be shown on the screen in a few seconds.

All lovers of plants or of science will be spellbound by his “Plants in Action” film which he is showing at the Phipps Auditorium June 17.

GEORGE W. KELLY.

CHrysanthEMUMS THRIVE IN HIGH MOUNTAINS

Benjamin Draper

Hardy chrysanthemums, developed by Professor E. J. Kraus of the University of Chicago, not only withstand the severe winters of the Windy City but they thrive in the far reaches of Colorado high mountain country where it is just as cold, if somewhat drier.

Experiments carried on for the last two years by Georgetown Enterprises, Inc., in cooperation with the University’s botany department, have shown that not only will mums survive Colorado mountain winters but the hardy plants will bloom in the short growing season here.

When planted in good rich soil, aided from time to time with a sprinkling of bone meal, the plants reach maturity every year. The experiments have shown that warm sunny spots are best for planting; avoid shaded places and beds against buildings.

Begun in 1946, the experiments have included planting in Georgetown, Central City and Silver Plume. The local firm has been conducting similar trial plantings in a good many directions with a view to developing perennials that can be used to advantage by summer cottagers who are not always able to give daily and intensive attention to their gardens.

The interest of The University of Chicago was enlisted by the writer, a Georgetown man, and alumnus of that institution. The hardy plants were first developed by the University as a part of its Woodlawn beautification program. This University community is now noted for its annual fall exhibit of gardens planted with almost every variety and kind of chrysanthemum.

Ninety percent of the plants set out survived last winter, the severest in the mountains in fifty years, having rooted when planted the previous year.

Experiments for this coming summer will include varieties of early blooming gladiolus and several other perennial plants.
AN EASILY-GROWN WILDFLOWER

FRANCES BINKLEY.

The gaunt plant of the Spiderwort (Tradescantia occidentalis), upright cousin of the Wandering Jew, may seem scarcely worth moving into the garden. But if its long, linear leaves and angular stem are allowed to grow up through other screening plants, the deep blue of the three-petaled flower justifies its place there. The plants are interesting also for the reminder, brought by the name, of John Tradescant, traveller, gardener and director of the horticultural enterprises of Charles I of England. His son collected American wild flowers in Virginia in 1637.

Tradescantias may be transplanted from the fields, or propagated by cuttings. They are said to grow readily from seeds. Once established they flourish cheerfully without any special care. Mine have continued several years on a sunny east slope. Tradescantia occidentalis is common in the foothills and plains region. T. virginiana, a larger plant, is found farther east. Horticultural varieties have been developed, and are available in colors ranging through pure white, porcelain blue, pink and the mauves and purples.

THE WEEK-END GARDENER

TODAY I see that I will have to get down to my season’s routine of garden care. The weeds are coming and threatening to choke out the little seedlings, the grass is growing into the flower borders and the ground on the south of the house is already hard and dry. I’ll get the hose started on the dry spot and sharpen up my spade to trim up the lawn edges. The lawn always seems to want to grow better in the places where it is not wanted. The Oldtimer tells me that it may be because there is richer, looser soil in the flower borders than where the grass was planted. He tells me that grass can manage to exist in poor soil, but that it can only grow vigorously in well-prepared rich soil. I saved a few dollars when I put in my lawn, but I expect that it has cost me many times that amount in the last ten years keeping it fertilized so that it would look at all good.

Oh, my aching back, I can’t figure out how those beet workers go all day long bent over weeding. I’ll never be the same again. Seems like someone should find a way to keep the weeds down without so much hard work.

I’ll ask the Oldtimer again. He tells me that many gardeners are trying to duplicate Nature’s way by mulching rather than weeding and cultivating so much. He says that the deep cultivation that many people practice will do more harm than good, because of the roots destroyed. I asked him just what good cultivation was anyhow. He told me that the main purpose was to kill competing weeds, and that mulching would do that, as well as keeping the ground cool and moist. He calls mulching the lazy man’s way, but it looks to me as though it was nearer Nature’s way, and from reports I get it does actually help to raise finer plants, and is much less work. He also tells me that peat, leafmold or, under some conditions, straw, manure or sawdust may be used.

Now, with my lawn mowed, the edges trimmed, the dry spots soaked, and my borders all cultivated or mulched I believe that I can take enough time to sit a few minutes on that new seat and enjoy it all.

KEEP PEACE WITH YOUR SOIL

By V. A. TIEDENS

Reprinted by Permission from Horticulture

The chemical and physical condition of the soil in your garden will determine the type of root system that your plants will make and the type of root system will determine what flowers and fruit you will get from the tops. If we could view the roots in the ground as well as we can the tops, we would have an answer to why we have the kinds of plants that we do. Few of us are satisfied with our plants. We want show specimens. Our soils vary widely but we can all grow good plants if we pay attention to details. There are many things that can affect our plants but, if the soil is not right, we have two strikes against us before we start. Few of us appreciate the importance of the condition of the soil. Directly or indirectly our food comes from plants. If we would approach a “Utopia” we must be kind to our soil. Our soil will make a return exactly in proportion to the way we treat it.
THE Colorado Spruce Gall Aphid

By Paul N. Morrow

The Douglas Fir or Spruce Gall Aphid, the little insect that causes the young tips of spruce to swell, turn brown and at a distance have somewhat the appearance of a cone, is one of the most talked about of the insects that attack ornamental plants.

I have never seen either a Spruce or Fir die from these attacks. They can, however, cause serious damage and disfigure the trees by turning the tips brown; thus killing the terminal bud and directing the expanding growth to lateral buds instead.

The ill effect it has on Firs is much less serious, usually limited to the yellowing of the area where the aphid insert their beaks into the needles. In case of a serious infestation, the whole tree may have a slight yellow cast and lose many needles.

The Douglas Fir Aphid has a very peculiar and interesting life cycle. There are two generations each year, and two forms, the winged and wingless. The winged has two host plants (fir and spruce) between which they alternate. The first generation that hatches in the spring matures both winged and wingless in July. This is the time when the spruce troubles begin. The winged Aphids migrate to the Spruce where they produce the second generation that "over-winters" on the back of the young spruce twigs. This group of aphids will mature in May and produce another crop which establish themselves immediately at the base of the needles on the young spruce twigs and begin sucking the juices from the plant. This sucking causes the pedistal of the needle to swell to such an extent that the needles touch at a point slightly above the twig, forming small pockets at the base of the needles thus providing a place for the Aphid to secrete himself until maturity. This feeding and swelling causes the area affected to die.

Fir twigs enlarged several times, showing aphid egg nests in which the aphid that migrated from the spruce to the fir laid their eggs.

Gall caused by spruce gall aphid, swelling to several times the diameter of the new twig and giving somewhat the appearance of cones.
gradually. Hence the brown cone effect. In July this gall dries out and cracks open, releasing the young insects. The young then moult, develop wings and fly away to a Douglas Fir, where they lay eggs in white waxy nests. The eggs hatch in from 7 to 10 days into coal black nymphs. They remain on the underside of the Fir needles through the winter. In the Spring the females lay eggs which hatch at the time new growth starts on the Fir. Winged individuals are produced in this group that migrate back to the Blue Spruce thus completing the life cycle of the Spruce Gall Aphid. The cycle requires 4 generations, two years time and two host plants.

Control: The Spruce gall aphid is not difficult to kill. Almost any contact spray will kill the insect and most ovicidal sprays properly emulsified will prevent the eggs from hatching. The greatest concern in Spruce Gall control is in selecting a material of proper dilution that will not injure the plant. Timing the application is important in preventing injury and in getting maximum kills.

Spraying Spruce during the months of June and July while the insects are inside the gall is of no value. Fall spraying of the Spruce will catch the brood that has just migrated from the fir and established itself to "over-winter" on the young twigs.

The use of oil on Evergreens causes greater foliage damage in fall than when applied in early spring before growth starts.

Three fir needles greatly enlarged, showing nest from which the young have emerged and established themselves along the underside of needle, where they stay through the winter.

Spruce gall cut open, showing enlarged needle bases and pockets in which the aphids secrete themselves until maturity. The dark spots are aphids. The white substance in the pockets is the residue of molts.
THE WEEK-END GARDENER

I was thinking, as I drove home from work today at noon, that this is the time of year that all good gardeners live for—New leaves breaking out, flowers blooming, and everything looking so fresh and new, beginning a new year's growth. I believe that I will take time, after lunch, to just walk around a while and look at the display made by my neighbors' gardens. With so many things to do in my own garden it is hard to take the time, but gardening is for enjoyment after all, and I should take time to get a little of that enjoyment as I go along.

I have seen, in the last hour, a lot of things which I can use in my garden, and I've also seen a number of horrible examples of the things that I should avoid. I wonder if I will remember them? I guess that this is a good time to start that garden calendar and reminder. It seems that when I notice a thing which needs to be done it is never the time to do it—the spring blooming tulips must be planted in the fall, and the fall-blooming perennials moved in spring.

Some more plants were just delivered by the nurseryman. I'll get them right into the ground, as they are beginning to leaf out. Whoa, there, I dug right into the center of a peony plant that I had forgotten all about. Now my shovel came up with half a tulip bulb. I'm going to stop right now and get a big piece of paper and make a map of my garden. I'll make a resolution to check this map every week and mark the location and name of every plant as it appears. Monday morning I'll go over to the seed store and get some plant labels to mark some of the new plants. I just can't remember all these new names or where I planted things.

That vacant place in the border reminds me that I was going to order a half dozen floribunda roses. I'd better get them at once or it will be too late until next year. I'll dig the holes now and be ready for them. Oops—what is this—bricks and gravel—Now I'll have to wheel it all out and get some good soil someplace to fill the hole. I hope Mom has plenty to eat tonight. I'm hungry as a wolf.

A FAMILY-UTILITY GREENHOUSE

Janet Chapman

I fell heir to a small greenhouse when we purchased a home in Colorado Springs. Not only has it been useful but it has proven to be such a source of pleasure and relaxation that I would not want to live without one. Because mine is an old-timer it is of very sturdy construction. Today it is possible to obtain a small greenhouse in prefabricated portions, ready to set up. But for any style I recommend that one wall be attached either to the garage or, better still, to the house itself. I recommend further that it has only two exposures (aside from the roof), preferably south and west. If the north side is blocked solid it aids the heating situation and protects any plants or vines that grow on or near it.

My greenhouse, east side against a tool shed, is about 12x20 feet with a cement walk in the middle and earth-filled benches, 3 ft. from the ground, 3 ft. wide and 5 inches deep, on three sides. Under the earth for drainage are touching tiles, 4 in. square, held in place by metal strips. In the ground below the benches I grow such things as ivy, myrtle, varieties of violets and other shade-loving plants. Hence it is a double-decker!

The heating system consists of hot water radiators lining the walls below the benches and heated from a gas furnace housed in a separate outside unit. (One great advantage in having a greenhouse attached to the dwelling is that the heat can come from the main furnace.) A thermostat on the inner, east wall is set at 40 degrees, warm enough for normal needs and, if the temperature goes below 35 degrees, because of some accidental failure of the heating plant, a bell in the kitchen...

Our Greenhouse in Winter.
rings. There are ventilators in the roof that can be adjusted and on moderate days the door is left open for more air. As a glass house is very vulnerable to hail, as well as to small boys with stones, I have protected the roof with wire netting placed on a frame two inches above the glass.

Many and Diversified Uses

My initial interest was the possibility of freshening up and carrying over house plants and I have acquired quite a reputation for getting a second blooming from azaleas. Another immediate use was to start annuals for the garden and to winter bulbs and other plants from the garden.

Then the ambition seized me to try to have cut flowers throughout the winter. It is very exciting to take nasturtiums to shut-in friends in February; to have strawberry plants in bloom for Christmas presents. From the culinary angle I always have a border of parsley. In the flowers I have had good luck with calendula, snapdragons, stock, mignonette, ranunculus and anemones.

Everyone tends to specialize, so I am developing a cannella collection. They are grown in pots, set in the earth in the benches in winter and in the borders outdoors in the summer time. They make highly desirable greenhouse denizens as they are both beautiful and easy to care for. It pays dividends to buy big plants as they bloom sooner and more profusely. The present collection of twenty plants has so far this season produced fifty blooms, with more to come. A word of warning—when picking, twist the blossom off at the head. Do not cut the stem or branch as that destroys the next year's growth.

In the early summer, because of the intense heat, everything is taken out of the greenhouse except the plants on the lower deck.

Then tomato culture begins. These can bear the strong sun and they are sheltered from wind and hail, two threats to outdoor-grown tomatoes in Colorado. One can get special seeds for greenhouse tomatoes; the plants are started early and spaced when the house is emptied. I prefer the small, gem-like red and yellow varieties as well as the Rutgers and we are never without them from June to October—plenty for eating, pickling and giving away.

Greenhouse Chores

I have tried purposely to restrict my greenhouse activities to a one-person basis and have simplified the care of it as much as possible. A most satisfactory method of insect control, instead of the eternal spraying, is to use a 1/2 lb. can of Nico-Fume, a pressure fumigator, for this size greenhouse. Follow carefully the directions found on the can, after giving all the plants a thorough watering. In a matter of seconds a tremendous cloud of tobacco smoke fills the greenhouse. As it is poisonous the house should not be entered again for twelve hours. This treatment twice a winter seems to take care of all insect pests. I advise, however, that any visiting plant be carefully inspected before it is admitted.

Watering should be done daily, more or less heavily, according to season and dryness of the air. This chore is really a pleasure for it gives one an opportunity for several deep breaths of moisture-laden air—a rare treat in this dry climate. Get, if you can, a plastic hose. It can be had in a variety of colors. It is amazingly light weight and easy to handle.

Each fall, when it is time to put the plants back in the house and plant the seeds for winter flowers, the earth in the benches should be sifted, tested for deficiencies and the soil, lost by transplanting to the garden, replaced.

Further Possibilities

I have told briefly the uses to which I have put my greenhouse to date but there can be as much variation in detail as there are owners and tastes. Sometime I would like to try:

Bulbs—freesias, grape hyacinths, tulips, jonquils, iris.

Cut flowers, in addition to those mentioned—sweet peas, heliotrope, pink, chrysanthemum, salpiglossis.

Herbs for the kitchen; chives in pots.

Propagation of house plants from cuttings.

Growing unusual plants for Christmas presents—Pyraclias (graber), begonias, fuchsias, gloxinia, primula and many more.

Every season brings its special fun but I have finally decided that the most stimulating time to work in a greenhouse is in snowy weather; it is so cozy, so warm, so exciting.

SPRING IN THE GARDEN

Primroses fair and daffodils
Laugh up at us. A robin trills
And happy heartsease faces glow;
A kind sun warms the teeming earth.

Bringing the myriad seeds to birth;
Soft showers fall, mild breeze blows—
And life is sweet, all gardeners know!

Soon many a weed or ruthless pest
Will tax our muscles, steal our rest,
Or of our plantings get the best.
Some prize will die, another sicken—
But now, while heart and pulses quicken,
Let's revel in our garden labor
And brag about it to our neighbor!

MAUD McCOlRMICK.

HORTICULTURAL MEETING

We have secured the Silver Glade room at the Cosmopolitan Hotel for the Rocky Mountain Horticultural Conference to be held February 7 and 8, 1949. We would appreciate suggestions as to the program.
WE DO IT IN LANSING!

CARL FENNER
Assistant City Forester

Extract from Paper Read at Rocky Mountain Horticultural Conference,

Editor's Note: Much of the beauty and attractiveness of Denver depends upon the trees with which her streets are lined and her gardens abloom. The balance of nature has been disrupted by the bringing in of large numbers of trees not native here. Now various insects and diseases have discovered that conditions are ideal here for their depredations since the control by their natural predators, found in other states, is lacking. In the last few years especially, many new pests have been discovered working on our shade trees. Some of these have become serious (the Dutch Elm disease for instance) and are likely to do a great deal of damage, or even wipe out an entire species, unless a more suitable system of city tree care is inaugurated. Here are some suggestions from the plan now in use so successfully in Lansing, Michigan. We recommend it for study.

Brief History of the Plan

The original planners and first residents of our city, as was often the case in those days, were very tree conscious and planted diligently all the streets of the young town to native varieties of shade trees. It was for the purpose of preserving this wealth of tree growth and to extend the planting of more trees in newly-developed streets that the forestry or tree care department was organized in 1919.

It was reasoned and has proved to be true that the trees could be trimmed, sprayed, repaired, old ones removed and new ones planted in a uniform manner at lower cost if administered through a municipal department equipped to do such work. Taking into consideration the tree population of the entire city, the average expenditure per tree per year is $1.10.

Financing

The funds to cover costs of tree care are appropriated by the City Council through the annual budget of the Park and Cemetery Board. Revenue to supply this budget is collected from taxes on residence property and commercial-industrial property in approximately equal proportions. Considering the small cost to the average homeowner (not in excess of $40 per year) it seems reasonable that the actual tree care should be planned primarily from the standpoint of the streets as a whole and secondarily from the standpoint of the individual owner. This interpretation of the system of a municipally financed and operated department is favorable to uniform results in the tree care program.

The use of funds directly from the city-wide budget offers a distinct advantage over the project assessment system in use in some communities. The project assessment system requires intricate and expensive maps and records of time, equipment and material in each and many separate areas of a city. Under our system this extra overhead work and expense, with the accompanying slow-down of actual work operations, is avoided. We have found that better, quicker, less expensive and more uniform tree service is thus supplied for the interest of the home owner and the beautification of the city as a whole.

Organization

Our City Charter provides for the establishment of a Park and Cemetery Board which consists of one citizen from each of the eight wards. The members are appointed by the Mayor and confirmed by the City Council. They serve without compensation for four-year terms which overlap in such a manner as to allow the change of not more than two memberships per year. This system assures continuous and long-range planning and operation of the department and a most secure FOUNDATION for uninterrupted progress.

The Board appoints the operating head or superintendent of Park, Cemetery, Forestry and Recreation activities. The superintendent appoints the Assistant City Forester who is in charge of tree care and arboricultural work in the parks and on the streets.

It is his duty to plan and manage the work of the forestry department.

Our experience has proved that the work can best be handled by use of four trained foremen who supervise the major activities. By rotating these men from year to year each man becomes familiar with the full scope of the program. The year-round tree crews under the foremen are augmented in the summer season by young men chosen for their interest and ability in the work. During the winter season the crews are augmented by regular park and golf course employees who would otherwise be dropped and perhaps lost from the organization.

The major activities are: Service (repairs), pruning, line clearance, pruning, planting, care of young trees and tree removal. The service activities consist of the work of repair to injuries due to storms, vehicles, children, animals and miscellaneous agencies, plus the pruning of weakened trees, spraying to control disease and insects and emergency tree removals. In addition to these tasks the Service man, because of his equipment and tree climbing ability, is assigned the work of maintaining outdoor skating rink floodlight systems operated by the parks. He also assists in park and golf course flag pole maintenance. The tree pruning crew trims the trees in the streets and parks. The line clearance pruning crew trims branches away from electric power lines, when and where such lines interfere with the growth and symmetry of the city's trees. The Planting and care activity section plants the new trees in spring and fall and cares for them throughout the summer months. Another activity, the removal of dead and undesirable trees, is accomplished during the winter season when all the foremen and their crews are free to participate.

Inspection and Consultation Service

The services of the Forester or his assistant are available to residents of the city for inspection of trees, lawns, shrubs and garden plants located on the street frontage or on private property. No charge is made for this service. The home owner greatly appreciates this expert consultation and we find it to be a most important link in the maintenance of good public relations.

Planting Program

In 1930 the Forestry Division inaugurated a city-wide street tree planting program at city expense. Under this program each year a number of streets are supplied with trees without direct cost to the property owners located thereon. The number of trees and streets planted is dependent upon funds available for trees, planting and after-care. At the present date 93% of the city has been planted.

The general plan has been to plant up vacant areas in the older streets first, following with planting on the more improved outlying streets, walkways and curbed streets being given preference. The variety chosen depends principally upon the dominant species, if any, already growing on the particular street and upon the width of
parkway or tree belt between walk and curb. Elm, hackberry and sycamore are planted on tree belts 6 ft. or wider. The maples are set on parkways less than 6 ft. wide, and the fastigate or upright varieties are planted on very narrow streets where there is not sufficient room for the standard species. Very small varieties such as althea and mountainash are planted in occasional and unavoidable lengthy spaces between standard kinds.

A charge is made, however, for the planting of all trees on streets which have not yet been included in the city-wide program (7% of street areas). The trees are planted at half cost, which at the present time is $5.50 for a 2 inch size, $8.00 for a 2 1/2 and 3 inch size. Subdividers of residence property are encouraged to plant their subdivisions by the reductions in cost made possible by large scale operations.

In the same way the over-all planning and co-ordinated work of the City Forestry Department makes possible other reductions in the cost of tree care to the property owners. As stated above the average expenditure per tree per year is $1.10.

The planting cost to the city averaged $12.00 per tree in 1947. The cost of removal of large trees—$50.00. Cost per tree for pruning—$3.46, for spraying—$1.84.

Conditions affecting the municipalities of the North American scene are too diverse to allow the adoption of standard procedures for all localities. The policies and practices outlined here have proved sound for the time being in our own particular city. We offer these ideas in the hope that some of them may be applicable to your problems.

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**THE WEEK-END GARDENER**

The Oldtimer gave me a book yesterday that tells all about how plants grow, how the sap flows, how the sun changes crude materials into digestible plant food, and how the cells of the plant grow and multiply. It is really a thrilling story. I’m going to borrow his hand lens and look at some of these common leaves and blossoms. He says that it will open up a whole new world to me.

I can understand now why that tree man told me that I should cut those stubs out of my trees. I thought that it would hurt the tree to cut limbs off close, but he showed me how that the only way a wound could heal was to have it cut so that the sap in flowing by would deposit new growth to heal over a cut place. I thought that I was getting a lot for my money when I got an ash hauler to cut a lot of limbs off my tree, but I see now where most of this cutting was unnecessary, and that the wounds left can never properly heal.

After reading the Oldtimer’s book I can understand why plants can not do well without sunshine, and why the ground must be kept loose enough to allow some air to penetrate. I can see now why plants die in winter when they have no moisture around their roots and the hot sun shines on them.

My lawn begins to look spotty—bare in places and weeds starting in other places. I'll have to talk to the Oldtimer again. He says that there is no excuse for having a weedy lawn anymore, that the new 2,4-D weed killers will destroy most all broadleaf weeds and will not seriously damage a lawn. I'll try once. He warns me not to let this weed-killing spray drift in the wind as it may seriously damage trees or shrubs.

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**DUTCH ELM DISEASE**

The Dutch Elm disease (Ceratostomella ulmi) is a fungus disease which has caused the loss of thousands of America’s finest elm trees. It is serious enough to be of National importance. Traditionally, the elm is as much a part of America as Plymouth Rock!

Your Swingle representative, with a background of intelligent study and research, is always at your call to discuss this problem.

**DON’T DELAY!**

**Swingle Tree Surgery Company**

Member, National Shade Tree Conference

KE 4776
212 Keith Bldg.
Denver, Colo.
THE WORM TURNS

M. Ethel Ash

The article, “Contractor’s Soil”, seems to present a very hopeless situation to many new home builders but this need not be so. With some work and patience and not as much time as one would suppose, the nearly impossible is possible. By raking into the soil, lightly, as much green manure—grass cuttings, leaves, etc.—as can be gotten hold of, by keeping it moist so that it will decay more quickly and by impregnating the ground with a liberal supply of earthworms, nature will in a comparatively short time produce a good layer of top soil. Here are a few facts about this tiller of the soil.

Earthworms are the miracle animals of the world. The great minds of both our time and ancient times have given considerable thought and study to the chemical and mechanical working of the world’s most simply constructed laboratory—the digestive system of the lowly earthworm!

The Worm Turns anything within its limited area including garbage, decayed vegetation, animal waste, etc., into the most complete fertilizer. Darwin found that 53,000 earthworms to the acer would produce 120 tons of worm castings—a pure natural fertilizer—in six months time.

In different parts of the country where the soil is very rich, scientists have found 250,000 to 3½ million earthworms to the acre. Soil so densely populated with earthworms can be used indefinitely without wearing out. The valley of the Nile River, a 5,000,000 acre tract, considered the most fertile area in the world has an untold population of earthworms. This garden spot has been continuously and abundantly farmed for over 6,000 years.

The Worm Turns the earth into millions of little tunnels by eating its way through it. Moisture is easily distributed through these tunnels and the ground is aerated without the use of mechanical means.

The Worm Turns the food and soil it eats into rich castings. It will eat its body’s weight in 24 hours. It likes a cool, moist soil and this can be provided by using a heavy mulch of leaves, grass cuttings, etc., which is placed between the garden rows and around flowers, shrubs and trees. In a short time, with the aid of friend Earthworm, even the hardest clay soil will become rich, black and crumbly. This almost eliminates hoeing and weeding, thus lessening the chore of gardening and increasing the pleasure.
HYDROPONICS—ON THE MARCH

HYDROPONICS is a term which means little to many people who are surprised and delighted to learn that a simple name for it is Soilless Growing. While it is generally believed that this method of chemical cultivation is new in our century, quite the contrary is true, since in 1699 a man named Woodward grew spearmint in water to which he added chemicals! There was some experimentation by French chemists during the nineteenth century but only during the past twenty years has Hydroponics been on the march.

There were two basic reasons for the development of this science: the conviction of growers that larger and better yields could be obtained where all conditions including feeding could be controlled; and the necessity for growing food and flowers in barren and worn out soil areas. Hydroponics is the perfect answer in both cases.

For many years this work was all carried out in laboratories but in 1936 experimentation expanded greatly in the agricultural schools of many states, including Colorado. Because of their generous dissemination of information, it was not long before commercial greenhouses were making large-scale plantings of vegetables and flowers and by 1938 soilless growing became an industry. While sand, cinders and other media for supporting plants were tried, gravel proved most satisfactory and the term “Gravel Culture” is now synonymous with Hydroponics.

The soilless method of planting has many advantages over the soil method: it allows closer planting, thereby conserving space; perfect nutrient conditions may be maintained by the testing of solution and replenishing of used elements; larger yields are produced; there is relative freedom from diseases carried by decaying matter in soil; the work is clean. While gravel is used in beds where the plants are to grow, it is general practice among soilless gardeners to start their seeds in flats of sand. When the tiny seedlings begin to appear, they are fed the nutrient solution by use of a bulb spray. This method of seed planting is also advantageous for soil gardeners, since there is less root disturbance in removal from sand than from soil in transplanting.

In some sections the soil is very fertile and it seems that anything grows well and produces heavily with little fertilization. In others, however, quite the reverse is true; in some the soil is worn out and in others there is no virgin fertility but only sand and gravel. It can be readily seen that in such situations there could be no growing of food for the populace were it not for Hydroponics. Solutions which are effective in greenhouses are being successfully used by growers who have poor, sandy soil and are beneficial to good soil. When Pan American Airways began to use Wake Island as a refueling station in 1938, it was necessary to maintain a staff there. By the time the clippers reached Wake, they needed not only fuel but food supplies. Since there was neither space nor soil for planting food on the tiny coral atoll, the problem was solved by the planting of a gravel culture bench of one hundred square feet in which was raised sufficient food for the residents of Wake, the crews and passengers of the clipper ships.

To the amateur one of the greatest benefits to be derived from all the work in soilless growing is an increased and more accurate knowledge of how to grow successfully in soil.
AIR IN SOIL IS VITAL AS WATER, TO PLANT ROOTS

IMPORTANTCE of fresh air to garden plant roots has been stressed by recent scientific studies, which have proved that in porous soil the air down to a depth of eight inches is completely changed once every hour.

Both the leaves and roots of land plants breathe. When the soil in which they grow is flooded, air is excluded, and when this condition lasts too long the plant can drown, as surely as, though more slowly than, an animal which sinks under water.

As water sinks down and drains off, air re-enters the porous soil, provided the surface of the soil allows free passage. But when the surface is compacted, as a result of wetting, baking in the sun or other causes, circulation of the air is checked, and the plants will suffer.

To loosen a compact or crusted surface and restore the free exchange of air is a chief purpose of cultivation.

The destruction of weeds is another. The former theory that cultivation is necessary to create a "dust mulch" on the soil to check evaporation of soil water is no longer widely held.

Experiments have definitely disposed of the old theory that the deeper soil is cultivated the better, however. It seems to be established that an inch, or two inches at the most, is as deep as the hoe should go down. Stirring any deeper, particularly close to plants, may disturb the roots of growing plants and do more harm than good.

Mulches over the soil will serve the same purpose as cultivation, by preventing crust formation, and keeping fresh air in the soil. Good drainage is also stressed by the studies in aeration. Unless water runs off quickly, after a flooding rain, lack of air will injure and perhaps destroy the plants.