HELP!!!

Our State Flower is dying out!! Help save the Columbine!

WHAT GOOD IS A BIG BUNCH OF FADED WILD FLOWERS? NONE!

- Wild flowers will be crushed and dead if you carry home a quantity.
- Enjoy them where they grow.
- Leave their roots in the ground.
- Leave plenty of them to go to seed.
- Then you will have beautiful mountain gardens every year.

Show the other fellow that taking an armful of flowers is stealing from his own pleasure in future summers.

COLORADO MOUNTAIN CLUB
DENVER GARDEN CLUB
HORTICULTURE SOCIETY

The above is a reproduction of an old card which was distributed about 1922 by a joint committee from existing conservation organizations. It is very appropriate to repeat it at this time.
**THIMBLEBERRY**

**Picture on front cover.**

This is one of our most valuable native shrubs. When the native plants are in bloom along our canyon roads they come close to rivalling the flowering dogwood of the east and south. The blooms resemble single white roses. The habit of the shrub is neat, somewhat similar to spirea. They are very adaptable to cultivation, their chief fault being that they sometimes become overgrown with the extra care of good soil and plenty of water.

An unforgettable effect could be had by planting many thousands of these shrubs along our state highways. They are also excellent for planting around mountain homes as well as in city gardens.

The botanist and horticulturist have had a hard time deciding exactly which is the correct name for this plant. The Standardized Plant Names now calls it Boulder Raspberry, Rubus deliciosus, but we find it difficult to call it anything else but Thimbleberry.

This excellent picture was taken by Charles J. Ott.

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**CARE IN USE OF 2,4-D NECESSARY**

From Shade Tree Digest, Presented by Swingle Tree Surgery Co.

2,4-D, like fire, is a useful tool of man if used properly, but an agent of destruction if it escapes control. During the past several years there have been an increasing number of tree and shrub injuries traced directly to careless or improper use of this selective weed-killer.

Commonly used to control weed growth in lawns, 2,4-D injury to nearby trees, shrubs and flowers may occur in three different ways: (1) direct splash or mist drift, (2) vapor drift, and (3) root absorption through the soil. Splashing or inadvertently spraying tree and shrub foliage with 2,4-D is simply carelessness that can be controlled. Mist drift frequently results from the use of improper equipment, or application during windy weather. Some of the 2,4-D compounds are highly volatile and although applications may be carefully and correctly performed, vapor arising from the drying chemical may be potent enough to cause injury to foliage. There is considerable controversy concerning the possibility of root absorption through the soil. There is evidence, however, which indicates that injury in this manner may occur through drastic overuse or too frequent applications whereby the soil becomes liberally soaked. Such heavy applications are not, of course, in accord with manufacturers' directions, but sometimes are made on the fallacious theory that "if a little is good, a lot is better."

2,4-D has gained wide repute, and rightly so, as a selective killer of plantain, dandelion and other broad-leaved weeds in lawn areas. But for safety to nearby trees and other ornamentals, it is essential that the right kind of equipment be employed when the chemical is applied. Furthermore the operator should be thoroughly familiar with the various 2,4-D compounds and able to select the type best suited for the particular job involved. Most important of all, it should be borne in mind that 2,4-D is as toxic to all broad-leaved plants and to many evergreens, as the most deadly poison is to man, and should be handled accordingly.

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THE COLORADO FORESTRY AND HORTICULTURE ASSOCIATION
1355 Bonneck Street * Denver 4, Colorado * Ather 3410
THE WATERS

One of the nicest things that has ever happened to this editor is the sudden movement to help buy a new car to replace the old Plymouth station-wagon which was about ready to drop out of sight like the "one horse chaise." When Mrs. Fowler's basket was announced at the auction someone suggested that it be the start of a fund to buy a new car, as the old one was very conspicuous at the time. This $100.00 raised by the basket has been the nucleus for a snowball of donations which enabled us to pay about one thousand dollars down on a new Chevrolet Suburban car. This is now in use. It will carry up to ten people (if they are not too large), will carry five or six and baggage or will easily sleep two people. It is built like a truck with extra heavy tires and low gear yet looks good and will make good speed on the road. It should be of service for many years to come.

We have been severely criticized in the past for spending so much personal money on the Association's work and not saving up to buy a new car. This policy may not be good business but it now seems that the work of the Association has been promoted when it was needed and a new car has come forth when it was needed.

John Swingle, Mrs. George Garrey and Helen Fowler have been especially active in promoting this project.

We feel like we had had a whole flock of Christmases rolled into one. Surely these Horticulture House people are the finest in the world.

GEORGE W. KELLY.
TO USE the term winter kill is hard words. Just what is it? What causes it? A lot of factors enter into the term winter kill. Some will say the winter was too dry, others will say it was too cold. Again, you will hear that the sap stayed up too long. But when you analyze all these facts it adds up to just one thing, the sudden change of temperature and that is just what happened this winter.

If you go back to last October, you will remember it was a very warm dry month, most flowers especially the roses were all in full bloom, then along comes the 10th of November and it went to 8 below zero. That is just too much of a sudden freeze for plants to take that are not dormant. At the time of this freeze there were very few plants that were dormant. Plants like Lilacs and others make their buds early and go dormant even though they stay green. Plants of this type do not winter kill easily. On the other hand plants like Roses, Privet, Spirea, Chinese Elm and others keep on growing late, do not go dormant quickly, and are subject to winter kill.

A very dry fall and winter may cause some winter kill, but this kind of a kill is far different. It is caused from the lack of moisture not a freeze. When plants go dormant early in the fall you very seldom have any winter kill. When you get these sudden hard freezes like the one in November and again the first of February where it went to 25 below zero, you can always look for some winter kill.

HAVE you a corner or nook you do not know what to do with? This is a grand place to put in a small rock garden. One can sure have a lot of fun and get a lot of enjoyment from it. There are plants that you can put in a rock garden that belong nowhere else.

The first thing when making this rock garden is to select the place in a corner or next to a back fence by the garage. I think the most suitable place is the back yard. Here you can build and plant your rock garden to suit yourself. Make a mound of earth in an irregular shape, using native rock with some lichen on them. Do not use too small rocks and place these rocks so they will form pockets. Be careful that you do not use too many rocks and make it look just like a rockpile.

Now after you have built your rock garden, comes the fun of planting it. You will want to plan it with all low growing plants if it is in the sun. Plants like Alpine Aster, the low Campanula, Muralis creeping Phlox, Dianthus deltoides, Gypsophila reptans, Prunella, Rock roses, Sedum, Veronica incana, Veronica rupestris. If in the shade, such plants like Ferns, Primrose, Funkia, Lily-of-the-Valley, Sedum, Violets, Viola. Some of these varieties may be hard to find locally but, if you shop around, we think that most of these varieties can be found.

These pictures are from the Deffenbaugh garden in Golden. While this garden was not built by Mr. Lucking it serves to illustrate his points.
IT IS heartbreaking to see all of the Juniperus Scopulorum (Silver Cedar) that are dead all over the city this spring. The Scopulorum will be a thing of the past if the red spider and aphids are not controlled. The Aphids are far more damaging. Aphids are small soft bodied insects that suck the sap from the small limbs of the Scopulorum. Spiders feed on the foliage.

Now to the killing of the Cedars last winter, if you go back to the month of October, 1950, you will remember there was a temperature of 80 degrees and more, and very dry. This was just ideal for the breeding of aphids and spiders. In the parks we noticed that there was some brown showing on the cedars at that time. When looking close we found the worst infestation that we have ever seen. You would think at that time of year it would be safe to forget the cedars and not spray any more. Well, here is what happened, we sprayed, but in most cases it was too late, the aphids had a grand time feeding and sucking the life out of the Cedars making them very weak going into the winter, so what the aphids did not kill the winter did.

There is only one answer; to get everybody to spray at least two times, maybe three, a year. If the aphids and red spider are not controlled, there is a chance of the Scopulorum not being planted any more.

The Ponderosa Pine is another evergreen that is having its troubles. In this case it is not aphids or red spider. Of course wooly aphids and red spiders will attack pines, but here we have a fungus that is giving no end of trouble. This fungus seems to start on the tip end of the needles, turning the needles yellow then brown. Sometimes it will take a branch at a time, then again it will start all over the tree. So far there has been no control for this fungus. It has come to be very serious here in this territory. If you are not familiar with this disease you can see a good example of it on the south side of the Lake Junior High School.

The Ponderosa Pine is a native of Colorado, but does not seem to do well here in this Denver territory. I would like to see some research done on this disease.
PLANT BREEDING POSSIBILITIES AND TECHNIQUES FOR WESTERN HORTICULTURE

Dr. S. W. Edgecombe
Head, Department of Horticulture, Utah State Agricultural College, Logan, Utah

The title of this paper takes in a great deal of ground. Obviously, one cannot cover the entire field, but I think one can point the way, as one might say, for those who wish to do something to improve the plants that are now being grown in the Intermountain region. Probably the place to start from is to get a clear idea of the plants now being commonly grown by gardeners. This stock taking should be detailed. One should know the characteristics of each type of plant, its good points and its failings. That means that if there are 50 varieties in one particular plant, one should know the whole story about each variety. Also, one should learn the same information about any other species of this same group of plants that might be grown in the area. (It will be necessary to talk about genera, species and varieties in this paper; hence a series of definitions are necessary. We say that a species of plant is a group of plants that have certain botanical characters which are common to the group. Often there are several species which have a similar botanical character, but differ in certain botanical characters. These species are grouped into a genus. Two or more genera are termed a family. Groups of plants which have similar specific characters but which have a definite small difference are termed varieties. In horticultural plants, there are many named varieties which have no real botanical difference, but which are distinguished from each other by color of flower, shape of flower, number of flowers, or type of growth. Often there is as much difference between certain varieties in some species as there are between certain varieties in other species. Nevertheless, this terminology of genera, species and varieties is a useful method of classifying plants and talking about them.)

Sometimes the species that cannot be grown in the area are of great value to the plant breeder because they have certain characters such as more abundant flowering, resistance to insects, diseases or environmental conditions which would be valuable if they could be incorporated into the species that can be grown in the area. Many times we find that certain species have hardiness. That is that they are resistant to the peculiar soil, and climatic conditions in the area. However, they may lack the beauty or vigor of growth of some other species that cannot be grown in the area because of their lack of hardness.

When this happens, the plant breeder, by crossing the hardy species that can be grown in an area with the species or variety which cannot be grown can combine the good qualities of both into a plant that can be grown and which is superior to both of its parents. We talk of this process as hybridization in the first place. After the cross has been made and seedlings are produced, they are termed first generation plants. If the plant we are working with is one that is only propagated by seeds, it is necessary to purify the strain. If the plant is one that is usually propagated by vegetative propagation then we do not need to purify the strain but we can select a plant in the first generation which has all the desirable characteristics and propagate it. This is one advantage of vegetatively propagated plants. The breeding process is sometimes more difficult but the selection of the ideal plant is easy since it can be propagated in the impure form.

Seed reproduced plants present more of a problem as far as making selections are concerned. The first generation plants are all identical in genetical constitution when the two parent plants are pure for any group of characters. There may be some minor variations in size and form of the first generation plants. These variations are not due to the genetic or chromosomal makeup of the plants but are due to the environmental influences such as soil, water, etc. Selection in this generation is of no value with such plants. With such plants, it is necessary to save the seeds of the first generation plants and sow them. These seeds will produce plants which are termed second generation plants. It is in this group of plants that one makes selections. In this second generation due to the recombination of chromosomes and genes, one has an opportunity to select out plants that combine the good qualities of each of the parents. Theoretically, all the possible combinations of genes that were present in the two parents will appear in some plant if one grows a large enough population.

We have talked about the genes, chromosomes, and characters. Each plant or animal has a definite number of chromosomes in the body tissue. This number is called the somatic or diploid number of chromosomes. These chromosomes are in the nucleus of the cells and they are the only part of the cell that is involved in the inheritance of an individual.

When the plant forms a pollen grain or an egg cell in the ovary of the flower, a somatic cell becomes a specialized cell. This specialized cell undergoes a special type of division in which the chromosomes line up in pairs and a member of each pair is distributed to each one of the daughter cells. These daughter cells then have half the number of chromosomes that the parent somatic cell had. We talk about these reduced number of chromosome cells as haploid or sex cells. All normal pollen grains and egg cells have this reduced number of chromosomes or are in a haploid number. When an egg cell is fertilized with the male haploid number the somatic or diploid number of chromosomes or sex cells are restored since each of the egg cells and the male cells have a haploid number.

The new individual from this fertilization has the original somatic or diploid number of chromosomes and when its cells divide to form new cells each of the individual chromosomes divides into two equal similar chromosomes. Thus every somatic cell in a plant contains the same number of chromosomes as every other cell in the body tissue of the plant. However, when sex cells are formed by this plant this somatic number is reduced by half since the chromosomes that are alike and one member of each pair is passed on to the new sex cells.

This fact of separation of members of a chromosome pair during the production of sex cells is one of the fundamental things that we need to understand in breeding plants. Also we need to know that they are recombined in the new individual when the...
egg and male cells unite to form a new individual.

The genes which are discussed in plant breeding we know are located on the chromosomes in a linear order. With some plants so much research has been done on them that the plant breeders know in what portion of the chromosome the genes are located. This is particularly true in tomatoes, corn and a few other plants. In most of the horticultural plants that we are interested in, we do not know near this much because not much work has been done on them and also because some of them are very difficult to work with.

We have mentioned characters in plants. Tall habit of growth or a certain type of flower color are good illustrations of characters. Characters are the end result of genes in relation to environment. Characters may be due to the action of one gene or many genes and again sometimes several characters may be the result of one gene. Until the relationship between genes and characters are carefully worked out by the plant breeder or geneticist, no one can be sure just how many genes may be involved in the production of a character.

I have gone into these three terms, genes, chromosomes and characters because one has to know something about them before they can breed plants to the best advantage. Where the character that you want to incorporate into a new plant is due to only one gene it is very easy to do this.

You make the cross between the two varieties of plants. Grow the seed and secure the first generation. If the character is one that is recessive then you cross one of the first generation plants back to the parent that had the character that you wanted to transfer. This technique of crossing is termed a backcross.

Theoretically and practically, this is the method of transferring a single gene from one line of plants to another. The flower breeders in particular use this method a great deal when they have a desirable character to transfer to the commercial varieties.

I have mentioned a recessive character. It is a character that is not apparent in a plant when it is in an impure condition. A dominant character on the other hand is one which is apparent even when it is in an impure condition. If a new character is due to a dominant gene one can backcross to the parent that showed the character in the first place, but usually it is better to self the plant and save only the plants that show this dominant character in the next generation.

We know that one fourth of the plants in the second generation will be pure for this dominant character, one half will be impure and the remaining one fourth will be ones that show only the recessive to the dominant character.

Theoretically only 4 plants need to be grown in the second generation to secure results with a single gene. If two genes are involved in the production of a single character 16 plants are necessary to get all possible genetic combinations, if three genes then 64 plants are necessary. With some characters such as wheat stem rust where the breeder wants to get resistance to the rust and also high yields of marketable wheat there are many, many genes involved. Under such conditions, it is necessary to have as many as 15 thousand plants in the second generation. This large number is necessary in order to have all possible combinations in the second generation so that you may make every possible selection of plants.

A few plant breeders who are not familiar with the above facts grow small numbers of plants in the second generation, save seed of some of them and then grow a similar number of plants in the third and fourth generations. They think that they will find plants in these later generations which will be different from those that they grew in the second generation. All this takes time and is unnecessary because if you grow enough plants in the second generation, all the possible combinations of characters and genes will appear in the second generation.

So far I have gone into considerable detail concerning crossing. I have mentioned selection in the various generations. Plant selection is one of the hardest things that a plant breeder has to do. The reason Luther Burbank produced so many good things in such a short time was that he had an uncanny way of selecting out plants that had value.

A great deal of very good breeding has been done in horticulture by following only the selection method. How this may be done. You could go out into the mountains or on the prairies of this region and collect seed of Amelanchier (Juneberries). You would carefully pick fruit from the largest shrubs or those that had fruit of the type that you liked or some other character. Then you would plant the seeds in a flat or nursery row. I am sure if you made collections from many areas you would find a great variation in the plants that came from the seeds. Probably some of the seeds would produce plants that were very weak. In general you would discard these because they would lack vigor and would be undesirable for planting in home gardens. The remaining plants would have to be planted out in a field far enough apart to make sure that each plant would have enough space to develop fully. Then when the plants are full grown you are in a position to make selections. The criteria for making the selections are basically whatever objective you have in mind. It may be habit growth, type or size of flowers, size or quality of fruit, etc. Anyway you pick out the plants that most nearly fill the ideal that you have in mind. These plants are then propagated asexually and you are ready to introduce the new variety or varieties.

This is the method that has been widely used in the past to improve horticultural plants, particularly shrubs, flowers and to a limited extent, fruits. It does not involve a knowledge of genetics or cytology. It has given results but it is slow and may be likened to a shot gun method of securing results instead of a single shot method.

Unfortunately, at the present time, accurate information on characters and their inheritance is not known for most trees and shrubs and many ornamental plants. Until that information is known one has to work in a general way instead of in a more specific way.

One of the finest collections of trees and shrubs native to the great plains area is at the Great Plains Horticultural Station at Cheyenne, Wyoming. There they have growing material that has been collected from many sections of this plains area. One can look it over and see how it is growing under the rather difficult soil and environmental conditions of that location.

I think that there are tremendous possibilities of improving our native plants through selection and finally through crossing the finest selections with foreign species. One of the difficulties with trees is the long time required to test the products of crosses. Very few private individuals
will be interested because of the money and time involved. A man does not live long enough to see the results of his labor. Therefore generally, the improvement of trees will be done only at tax supported institutions where there is a continuity of money to support the work.

With shrubs and herbaceous ornamentals many private individuals as well as tax supported institutions are interested and will continue to be interested. Such long periods of time are not necessary for the end results and a person can develop it as a hobby and expect to carry it a long way in his lifetime. Mr. W. R. Leslie, Superintendent of the Morden Experimental Station, Morden Manitoba, Canada, who was with you at last year’s convention, has demonstrated what one governmental institution can do in one man’s lifetime with a project of this kind. Many of their projects are yielding improved varieties of Rosy Bloom crabs, lilacs, caraganas, etc.

I hesitate to suggest native plants that might be tried by someone who is interested in improving them. However, the native plant improvement field has been largely neglected because we as people like the unusual or unfamiliar plants more than those that we see everyday. Many of these native plants possess certain qualities such as hardness to our climatic conditions or resistance to the peculiar soil conditions which is not possessed by the introduced species or varieties of plants. In Utah in many portions of the state induced chlorosis is very severe. Under such conditions often the native plants are much more resistant than the introduced varieties. It may well be that future plantings of ornamentals will be more and more to these resistant native plants because the others will not grow.

There is one point that I do want to make in regard to the improvement of the ornamental plants for this intermountain area. The population in this area is relatively small as compared with the East and West coasts of the country. Large nurseries or seed houses that have breeding programs for the improvement of plants, will not try to develop plants particularly for this area. They instead will try to develop plants that are suitable for the areas where the population is larger because that is where the bulk of their sales are and will continue to be. The only way we will be able to have improved varieties is for either private or public plant breeders to develop them in this area. Good new varieties developed by the horticultural trade will not be selected for this area. In some instances they will be good here but that will be accidental since they will be selected for other regions.

I think that there is a great opportunity for anyone who is interested in this field to produce some very worthwhile varieties of ornamental plants. Furthermore, progress has to be made in this area by people of the area. This improvement of native ornamental plants is not a project that will likely yield large monetary returns. But it is a project that will become utterly fascinating to the one who becomes interested. Most of the individuals that are now working on such projects find that no day is long enough for them. Life takes on a much deeper meaning because they are creating types of life that will be a service to mankind long after their work ceases. Maybe that in itself is its greatest reward. For fun, stimulation and the good of the intermountain west try to improve some one of the present day ornamentals.

**LOOK AND LEARN GARDEN TOURS**

Here is a note to remind you that the second Look and Learn Garden Visit will take place on Wednesday, July 18th.

Don’t forget that the garden owners will be on hand to tell about them and landscape experts will be available to discuss the do’s and don’ts of gardening.

If you haven’t a season ticket, single tour tickets may be purchased for 75c at the first garden on the list that you visit.

The gardens on display this tour are:

- Mr. and Mrs. L. F. Nelson, 1655 Ivanhoe
- Dr. and Mrs. George P. Ellis, 1670 Poplar
- Dr. and Mrs. G. F. Roark, 1767 Tamarac
- Mr. and Mrs. Robert Ewalt, 2354 Elm St.
- Mr. and Mrs. Robert E. More, 2215 Locust
- Mr. and Mrs. Paul L. Hastings, 2960 Forest
- Mr. and Mrs. Walter Slagle, 60 Dexter

You are welcome to visit these gardens any time between 10 A.M. and 6 P.M. on this day. One garden in this group, the one shown above of Mr. and Mrs. Ewalt, will also be open in the evening with a display of special lighting.
feeding, and an occasional washing of its leaves with clear tepid water. When grown as a house plant it never makes the growth of its wild environment. Specimens usually seen are two to three feet tall and the leaves only attain a length between one and two feet.

It is these striking leaves for which the plant is grown. They are leathery and shiny, broad, more or less heart-shaped, and deeply incised. The first leaves may show only one or two holes or deep indentations, but later leaves are cut nearly to the mid-rib.

The rate of leaf production is dependent on warm, humid conditions and the amount of feeding. A well grown plant will make a new leaf every month or so. An aerial root is produced for each new leaf. Without support these roots reach downward to the soil and the plant remains bushlike. Trained to a tree fern pole or a strip of cork bark, the roots attach to the support and the plant climbs. Use of a tree fern pole has an advantage in that it can be kept moist, maintaining the humidity the plant appreciates.

**A HOUSE PLANT FOR MODERNs**

By CLAIRE NORTON

**PHILODENDRON** pertusum the florist will tell you it is; the botanist, Monstera deliciosa. In the vernacular it goes under the names of the Ceriman, Mexican Bread Fruit and Swiss Cheese Plant. If you go in for modern decor in your home buy it by whatever name you find, for this is the plant so prominently displayed in illustrations of modern interiors in the home magazines, even in linoleum ads. It is the perfect complement for those handsome pottery jardinières of modern design.

Philodendron pertusum, or Monstera, belongs to the Aroids, that family which gives us the true Philodendrons, the Pothos, Dieffenbachia, Chinese Evergreen, Calla-lilies and Jack-in-the-pulpit. It hails from tropical North and Central America where it grows to gigantic size, producing leaves with blades three feet in length, and long, stout epiphytic roots by which it also holds to the tree trunks on which it depends for support. These roots are used by the Indians for making baskets. Its cone-like fruits, rarely produced under house conditions, with a flavor combining pineapple and banana are eaten, hence its specific name of deliciosa and its common name of Mexican Bread Fruit.

Despite its high climbing, ambitious habits of growth it makes a splendid and easily grown house plant. It is tolerant of heat and subdued light and asks little beyond a good fibrous potting soil, regular watering and a well supplied root system without even a need for feeding. An occasional washing of its leaves will keep them leathery and shiny. The young specimens are cut nearly to the mid-rib and the later leaves are cut probably to the mid-rib. It is these striking leaves for which the plant is grown. They are leathery and shiny, broad, more or less heart-shaped, and deeply incised. The first leaves may show only one or two holes or deep indentations, but later leaves are cut nearly to the mid-rib.

The rate of leaf production is dependent on warm, humid conditions and the amount of feeding. A well grown plant will make a new leaf every month or so. An aerial root is produced for each new leaf. Without support these roots reach downward to the soil and the plant remains bushlike. Trained to a tree fern pole or a strip of cork bark, the roots attach to the support and the plant climbs. Use of a tree fern pole has an advantage in that it can be kept moist, maintaining the humidity the plant appreciates.

**HORTICULTURAL OPPORTUNITIES**

By GEORGE W. KELLY

As a nation we are gradually getting away from the idea that only those too dumb to make a living at anything else become gardeners. True, many people work with plants because they like it and do not consider the financial part of it, so that wages in the horticultural lines are low; but the various sciences and arts that a good horticulturist might profitably know are equal or greater than those required of medical doctors. In addition to an inherent love of plants and beauty, a good understanding of botany, landscape architecture, entomology, plant pathology, chemistry and engineering is necessary for training a well rounded gardener; as well as a smattering of architecture, general art engineering and such trades as carpentry, plumbing and stone work.

One of our great horticultural needs, almost as great as that for an active botanic garden, is a good training school for real dirt gardeners—those who would be valuable assistants to a nurseryman, tree specialist, or private estate owner. Along with this increase in trained gardeners we need a general reappraisal of the value of the trained gardener, by the average home owner, so that these trained men and women may receive salaries comparable to their training and knowledge of plant life.

There are opportunities for trained horticulturists in the City Parks, in the City Forestry departments, in State and National Parks, in schools, in private business such as nurseries and greenhouses; as gardeners, tree experts and landscape architects. The well trained and experienced horticulturist should be considered on a par with the other professions and trades that we have long respected.

Question: All kinds of roses have come up in my rose bed. How many types of roses are there? L. K., Denver.

Answer: The main classes of roses are tea, hybrid tea, hybrid perpetual, polyanthus (cluster), floribunda (large flowering polyanthus), fairy, very small, climber and the shrub rose.
EIGHT WAYS OF DEVELOPING A PATIO

A YEAR ago, at our "Antiques and Horribles" Sale the students of the Denver University School of Architecture exhibited several models of patios which they had developed in their class work. We took pictures of them which are reproduced here. Study these and you will get many good ideas for working out suitable landscaping for a modern garden. Each is based on the same space and same relation to the house. North is indicated by an arrow visible in some of the models.

MUSEUM PICTORIAL

The Trustees of the Denver Museum of Natural History announce a new publication, MUSEUM PICTORIAL, to be published at irregular intervals, with possibly four or more numbers annually. As indicated by the name, it is planned to use more illustrations than usual in museum reports, for it is felt that the camera should play an important part in all museum work. These issues will range from 32 to 96 pages and will be restricted to single subjects so that they will lend themselves to departmental filing. They will be devoted to activities of the museum staff ranging from life history studies of animals to expedition reports.

The first of the new series is just off the press. It is Number 1: Nature Photography with Miniature Cameras by Alfred M. Bailey.

The MUSEUM PICTORIALs will be sold separately at fifty cents each (plus 6¢ postage), or an unbroken series as issued may be obtained on a subscription basis from the Publications Department, Denver Museum of Natural History, City Park, Denver 6, Colorado. This offer is good for 1951 only.
GROWING LILIES FROM SEED
From Special Publication No. 3 of the North American Lily Society

THE least expensive way to build up a collection of lilies is to grow them from seed. Since virus diseases in lilies are not transmitted by seed, this method has the added advantage of assuring a start with clean healthy seedlings free from these diseases. It requires no more time and trouble than many other perennials.

Lilies can be divided into two types according to seed germination. The "quick germinating" type begins growth of both root and shoot within a few weeks after planting outside in the spring or indoors. They produce a relatively large bulb the first season and many will flower the second. The "slow germinating" type, on the other hand, produces only limited growth during the first exposure to good, warm growing conditions. The embryo merely produces a very small bulb, sometimes entirely within the seed coat and, since there is no stem growth, nothing appears above ground if planted in soil. A period of low temperature, either artificial refrigeration or the normal winter season, is necessary before the shoot dormancy is broken. Thus not until the second season of warmth does the stem appear above ground.

The following lilies are the "slow germinating" type. If planted in the fall or in the spring they show no top growth until the second spring or early summer.

- Leucanthemum var. leucanthemum vat. "Regale" and its hybrids
- Myriophyllum neileanum
- Ochraceum nepalense
- Papiliferum pumilum

The following lilies are the "quick germinating" type. If planted in the fall or in the spring they show no top growth until the second spring or early summer.

- Auratum auratum-speciosum hybrids
- Backhouse hybrids
- Bellingham hybrids
- Bolanderi hybrids
- Brownii hybrids
- Canadense hybrids
- Carrionii hybrids
- Carolinianum or michauxii hybrids
- Cathayanum hybrids
- Chalcodonicum hybrids
- Catesbaei hybrids
- Columbianum hybrids
- Cordatum hybrids
- Distichum hybrids
- Duckertti hybrids
- Giganteum hybrids
- Grayi hybrids
- Humboldtii hybrids

No two lists, such as those above, made up by different authorities will agree exactly. Many of you who have grown lilies from seed will probably take exception to one or more of the classifications. Apparent exceptions will take place after fall planting of the "slow" types when top growth may appear the first spring. This is probably the result of warm weather in the fall or winter after planting allowing the seed to produce the small bulb. Subsequent cold spells may be sufficient to break the shoot dormancy normally overcome the second winter. The effect of the degree of maturity of the seed upon its germinating behavior is not yet fully understood. There is some indication that relatively immature seed of the "slow" germinating type may behave like the "quick" type.

Time of Planting
It is advisable to separate lily seed into the two germination types and plant each separately. The "quick germinating" type may be planted outdoors either in the fall or spring. There is some danger of planting too early in the fall since the seed may germinate and be killed by subsequent low temperatures. Spring planting may be in April or early May depending upon your location and climate. Many find it desirable to plant the seed indoors in flats or pans in January and February, moving the growing seedlings outdoors when it has become warm enough. This additional growth will enable many to flower the second year that would not otherwise do so.

In outdoor handling of the "slow germinating" type it is best to plant in the spring or early summer. This gives plenty of time for the formation of the "seed bulb" before winter. Since no light is necessary for the first summer the seeds of this type may be planted during early summer in flats and stacked in the basement. Inspect them once a month or so to be sure they are kept slightly moist. Very few waterings will be necessary if they are kept in some cool, humid spot. In early winter the flats should be taken out to a cold frame or sheltered spot and carefully mulched. The following spring remove the mulch and the seedlings appear about a foot high.

Since light is not required until the shoot begins to grow, and because the formation of the seed bulb and the breaking of shoot dormancy do not require a full season of summer or winter temperatures, it is often possible to greatly speed up handling the "slow germinating" types as follows: Place the seed in jars of moistened peat or vermiculite (be sure to treat the seed with Arasan or Tersan—see DISEASE CONTROL) covered with wax paper or a lid to slow drying out. Beginning with a warm period alternate three or more intervals of warm (around 70°F.) and cold (around 40°F. as in your refrigerator). Inspect the contents at the end of each cold period and remove all seeds which have small bulbs and plant. Top growth appears in one or two weeks. One warm and one cold treatment will usually give a good percentage of seed bulbs. Thus if you start the treatment in the fall you will get top growth the next spring, a year ahead of the usual time. Seed which has not germinated may respond to another cycle and if it is valuable seed this should be continued. The varying response of seed to this treatment is difficult to explain and is another matter that should be carefully studied. The jars should be examined once a week or so during the warm period and if top growth is seen, those seeds must be taken out and planted to avoid loss. A little such growth during the cold period seems tc do no damage.

Planting
The seed may be planted outdoors in flats, frames, or open beds. The soil should be fertile, well drained, and contain enough sand and humus to resist baking. A good friable garden loam is very satisfactory for outdoor planting. For flats and frames a mixture of loam, granulated peat and sand in about equal parts works well. Recently many gardeners have had outstanding success using vermiculite as a medium for growing seedlings. If feeding can be handled satisfactorily this method gives excep-
tional control of water and air relationship. The seed should be covered about one-half inch deep when planted in flats, and from three-quarters to one inch when sown in frames or open ground. It is good practice to space the seed about one-half inch each way in a flat, and about one-half inch in rows six to eight inches apart in a frame or open ground bed.

**Disease Control**

Seeds should either be dusted with Arasan or soaked from 10 minutes to 24 hours in a saturated suspension of Tersan, the wettable form of Arasan. Spraying the seedlings every two weeks with bordeaux mixture or using copper lime dust to control Botrytis is good practice. During the hottest part of the summer the seedlings should be protected with lath or coarse cloth shade.

**Feeding**

If lily seed has been planted in good fertile soil, it is not likely that any further fertilization will be necessary. A complete fertilizer, such as a 5-10-5 may be used if the seedling leaves are light green in color and growth is slow. Seedlings in flats may be watered with a solution made by dissolving two tablespoonfuls of the 5-10-5 fertilizer per gallon of water. In open beds or frames a small handful of fertilizer to a three-foot row of seedlings should be ample.

**Transplanting and Mulching**

Lily seedlings are usually left in the flat or seed bed until the bulblets are at least 3/4 to 1/2 inch in diameter. This may be at the end of the second growing season or even earlier with quick growing kinds. They should then be transplanted to a nursery row to attain flowering size or may be planted in their permanent location. The small bulbs should be covered about three inches deep. Transplanting may be done in late summer while the tops are green or later in the fall when the tops have been killed by frost. In late fall after the first growing season of the seedlings above ground, the beds or flats outdoors should be mulched to prevent heaving of the bulblets during the winter. Sawdust, peat, glass wool or vermiculite are good materials that will not harbor mice which may cause damage if straw or hay are used.

All persons interested in lilies, whether gardeners, growers or dealers, are cordially invited to become members of the North American Lily Society. Annual membership is $3.00. The annual yearbook goes to all members. Write Dr. Robert N. Stewart, Treasurer, Route 1, Box 75D, Cedar Lane, Berwyn, Maryland.

**HOLLYHOCKS**

It is a queer quirk of human nature that many times we do not appreciate the nice things that are common and easy to get. How true it is that if Hollyhocks were hard to grow we would prize them as highly as orchids!

There is no flower in the Rocky Mountain region which will give a greater display of color for the effort expended, yet they are not grown as much as they should be. Some of our mountain towns by accident or otherwise, have hollyhocks growing all around the streets, alleys and yards. And, what a display they make!

Some people raise the silly objection that hollyhocks attract rats. Others see only the ragged stems of hollyhocks after they have finished blooming. The answer to both objections is to make it a rule to cut the hollyhocks down and destroy them when they have passed their prime of blooming.

Experimental evidence shows the necessity of a minimum of 4 cover spray applications for apples, to check worms. (These general rules may vary much in some areas. Editor.)
USE YOUR LIBRARY

Since being established some four years ago at Horticulture House, the Helen Fowler Horticultural Library has been built into an institution to be proud of. It is probably the most complete collection of books dealing with gardening and forestry west of the Mississippi.

Anyone interested in the subjects covered here is welcome to come in at any time that the house is open and refer to these books, but the privilege of checking them out is reserved to members of this Association.

Are you interested in lilies? There are several good books in the library all about lilies. Do you want to know more about the wild flowers, or just read a good story about other gardeners? There are books here just to suit you.

This is your library, that Helen Fowler has provided and Alice Wood has maintained. Come in and use it.
NINE hardy adventurers spent the last six days in May exploring some of the wild and wonderful parts of the Dinosaur National Monument. Two Jeeps were taken so that the primitive roads in the area could be negotiated. First camp was made at the gateway to the Lodore Canyon, where Major Powell so many years ago started his adventurous trip down through this deep and frightening canyon.

The second night was spent at the Mantle Ranch where the ancient Indian cliff dwellings and Pectoglyphs could be seen and studied. The third night was passed at Pat’s Hole under the shadow of Steamboat Rock at the junction of the Yampa and Green Rivers.

The fourth day we climbed out of the hole and viewed the amazing canyons from the vantage point of Harper’s Corner where we could look down some 3000 feet to our camp site of the night before. The fourth night found us camped on the Green River where it comes out of its deep canyon above Jensen, Utah. The Dinosaur quarry was quickly inspected and the party drove around to Island Park for the fifth night. From here some walked or rode over to Jones’ Hole some seven miles overland. Here we found a real Shangri La. A large stream of clear, cold water comes out of the mountain side and flows some six miles to lose itself in the waters of the muddy Green. Along this amazing stream are plants found nowhere else for many miles. The fantastically sculptured rocks rise up to the sky on every side and one truly feels in another world.

We all returned more than ever convinced that this wonderland created by Nature should not be destroyed for the benefit of some commercial development, as the papers of the last few weeks have finally admitted is the case. It is a fact that any truth-seeking person can verify that there are other places where dams may be built, to supply more power, more water storage or any other benefits that may be credited to dams, and that this irreplaceable monument may be preserved for the inspiration and education of future generations.

It is only from the fact that few people have seen this area that there could be any controversy as to the necessity of preserving it in its primitive nature for all time. And do not let anyone sell you the foolish idea that dams will make of this a superior recreational area. Nothing that destroys its natural wildness will do anything but ruin it. To preserve this area of wild and deep canyons should be the aim of every conservation minded person in our country. Now that the private interests who hope to profit from development of this area have come out in the open we can all know whom we have to fight and can know the basis for the many misrepresentations which have been currently circulated. This is an area of immense value to every one of us and we must protect it.

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Denver, Colo.
BIRDS IN OUR GARDEN
Ruth Ashton Nelson

The birds don't recognize any boundaries to our garden and so I find myself following them across the little road to the "woods" fringing the park. During the second week in May this was an ideal spot for birding—trees still mostly leafless, resident birds starting to nest and migratory ones feeding busily among the opening buds. The catkins on the tall cottonwoods, the tassels of fringes on the boxelders, the dark button-like blooms of the ash trees, all seemed to offer enticing meals to chickadees, orange-crowned and Audubon warblers, pine siskins, grosbeaks, bullock orioles and others. Some would feed on the buds or blooms themselves, but most would search out the insects harbored among them.

I found strolling along the road around our "bend" delightful and rewarding between six and seven on sunny mornings. The sun warmed my back and lighted the shrubbery and trees on the west so that bird watching was made easy. A pair of flickers, which frequently visit the garden to probe the ant hills, have been excavating a hole in a dead cottonwood stub. I first noticed their activity from the dinette window and had been watching them for several days. At first the work was enlarging the entrance hole from the outside. The site is only a few feet from the road, and the birds pay almost no attention to me as I walk by or stand searching the branches and sky with my field glasses. One morning I heard the tap-tapping but no bird was in sight. As I passed directly opposite the entrance hole in the stub, a bright face with red "moustache" marks appeared framed in the round hole. It regarded me intently for a moment then dropped out of sight and the tap-tapping continued. The female flew in with a flash of salmony red, uttering some charming soft guttural notes as she alighted on the home stub.

Another time it intrigued me to see a tiny house wren busily investigating every nook and crevice of the old stub practically under the beak of the flicker which was chipping away at the entrance hole, paying not the slightest attention to the wren.

At intervals considerable overflow water comes down from above and forms large puddles in the little road. Apparently this brings along an accumulation of seeds and insects which become concentrated where this water overflows. In addition it offers plenty of water for bathing and drinking, so it is a wonderful spot to watch. Here the Brewers blackbirds, easily recognized by their white eye-ring and their small size, may often be seen walking about, feeding and bathing. The male is handsome and the smooth brownish-gray female, to my notion, is much neater, trimmer and more elegant looking than her streaked cousin, the female red-wing.

The doves also like this spot, several often bathing at once. A thrill one morning was the sight of half a dozen lark sparrows bathing in the little pool. Another time two song sparrows, one white crown and one chippie were all enjoying it together.

I can watch this same spot from the window by my dressing table (just one of the delights of this new home). Twice one day a flash of red, yellow and black caught my eye as a male western tanager stopped for a drink.

Nesting is underway, a male Brewer blackbird busily tore shreds of barks from a dead cottonwood branch and flew away with his beak full of it. The doves and grosbeaks pick up sticks but don't seem to have anything very definite in mind as yet. No doubt there is much more going on which I have not caught. A pair of spotted towhees visited the garden on two occasions and at the near neighbors I saw a green-tailed towhee. I've been away from home since the middle of May and so can not say whether or not these settled down to housekeeping in our vicinity.

(Note: These comments appear from six weeks to two months later than the actual happening of the event recorded.)

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O. E. PEARSON, Arborist Phone AC 2809
The very future of the nation depends on our waking up to the need for sound conservation and the proper use of our water wealth. In the long run, this entire nation could fall into decadence, fail, even die, if we do not give the consideration we must to the water wealth and the soil wealth so closely linked with it.

That's right—the United States of America might die as a nation because of squandering the basic wealth we have in water.

Other nations, once lusty, have died—just because they suffered a "water shortage."

Humans are a part of the living world. No matter how complex and highly organized an environment they may live in, human life rests on a few simple things that are a part of what we call "the great outdoors." In the hurly-burly of modern society and economy, we get further and further away from these very simple things and lose sight of how all life depends on them. We get involved in the routines and services of our man-constructed environment so thoroughly we don't think much beyond the counter in the grocery store, the light switch, the city's bus system, the haberdashery or dress shop where we buy clothes. One of these indispensables is our share of water.

The basis of our approach involves an about-face from the predominant outlook we have held toward water. The overwhelming bulk of thought, action and funds has been directed at downstream, constructional works to utilize or control water at some point well along in transit line. Our water management must begin at ridgepoles between watersheds.

More especially, in the higher reaches of catchment basins, there should be less draining of swampy areas, particularly with public monies.

Water should be retarded in its travels from where it falls. Particularly it should be trapped as long as possible in higher gathering basins. If it is hurried away the opportunities for use are lessened. The more slowly it may travel the transit line, the more uses may be made of it.

Two principles are fundamental. The first is the allocation of water to all needs, in proportion to their service to community good. No single use should have a monopoly. The second is the maintenance of the highest possible usability in water throughout the line of transit. Reuse, and further reuse is imperative. Those who damage water beyond reuse are detrimental to community life.

The foregoing applies primarily to surface waters. The need for conservation is equally important in our ground water supplies.

The answer to where we may land in the future lies in the hands of an informed, aroused, alert, thinking public. It lies in your hands.
A final accounting of the Auction held May 19th shows a net profit of $1,042.72. This is a very gratifying result of work by the committee.

Mrs. Charlotte Barbour started as chairman of the committee and has things rather well lined up before she had to leave for the East. She turned over arrangements to Mrs. Winifred Pinkett who worked hard and efficiently to carry out final plans. Mrs. Churchill Owen and Mrs. Richard Davis assisted Mrs. Pinkett in sorting and arranging material for sale. Helen Fowler donated a large basket of food which she raffled off. Don Peach won it. Evelyn Johnston and her girls conducted the refreshment stand and collected for items as sold in their usual very efficient way.

John Swingle, who now surely is entitled to the title of Colonel, was the star of the day with his humor and blarney. People just loved to buy from him. There was a good crowd from start to finish and bidding was brisk. Besides getting bargains everyone had fun. Earl Sinnamon assisted John several times.

This is the least painful way to raise money for necessary expenses of the Association’s work that has been suggested to date. Look for the fall plant sale and the “Antiques and Horribles” sale next spring.

Between now and the Auction next year all members should be alert to locate good material to sell. If anyone is moving and has valuable antiques or furniture to dispose of, call us and we will arrange to get it and hold it until next year’s date.

A list of those who contributed time or money to help this auction is given below as near as can be remembered.


Mrs. H. Calvin Fisher, 1650 Monaco Blvd., Denver.

Mrs. Wm. Bryans, III, 760 Milwaukee.

Helen Newberry (Trade Winds Antique Shop), 1209 Logan.

Mrs. John Kerr, 1900 E. 7th Ave.

Mrs. Wallin G. Foster, 2020 E. 8th Ave.

Mrs. Geo. H. Garrey, 1300 E. 7th Ave.

Mrs. C. Walter Allen, 644 Monaco Parkway.

Mrs. Helen Fowler, 10,000 W. 44th Ave., Wheatridge.

Mrs. Moras Shubert, 2030 S. York.

Mrs. Frank McLister, 445 Westwood Drive.

Mrs. Hugh Catherwood, 128 Eudora.

Mrs. E. Johnston and Camp Fire Girls, 124 Delaware.

Mrs. E. C. Ellett, 1330 Gilpin.

Mrs. R. E. Pate, Jr., 490 Race.

Mrs. J. Churchill Owen, 3901 S. University, Englewood.

Mrs. Richard Davis, 860 Gaylord.

Mrs. J. Kerran Weckbaugh, 9 Cherry Hills Drive, Englewood.

Mrs. E. R. Kalmbach, 2654 Forest.

Mrs. Myron Blackmer, 4400 E. Quincy Ave., Englewood.

Mrs. Everett Parker, 120 Franklin.

Mrs. Wm. G. Evans, 130 Bannock.

Mrs. Alexander Barbour.

Mrs. Winifred Pinkett (in charge) and donated.

Mrs. Beverly E. Finch, 827 Sherman.

Leon’s Millinery, 2317 Williams.

Mayfair Market, 464 Garfield.

Mrs. R. L. Rickenbaugh, 361 Ash.

Mr. Richard E. Pate, Jr., w/Davis and Shaw Furniture Co.

Mrs. Robert M. Perry, 2151 Hawthorne Pl.

Mr. Walter Sawicki, Jr., 508 E. Hampden Ave., Englewood.

THE GREEN THUMB
July, 1931

JULY GARDENING

WEEDS we will always have with us. Many of the cultivated plants have been selected over the years for their size and beauty and have lost their ability to compete with those plants which have only been subject to the natural selection of those “fittest” to survive. Now that we have interfered with Nature to that extent we are doomed to an everlasting fight with these “weeds”. Get at them early when they are small and tender. Then they are easy to eliminate, but just turn your back on them a few days and they become so established that they require much muscle and sweat to destroy.

WATERING will begin to be a problem this month as the days become warmer and less natural rainfall can be expected. If lawns and other plants have been prepared for this weather by compelling them to send their roots deep they will survive this hot weather with a minimum of damage. Water thoroughly each time so that the moisture really gets down to the farthest roots of the plants, then wait until they need it before watering again. How can you tell when a plant needs water? Some have a green thumb and know by instinct, and others dig down occasionally and see how much moisture is in the lower soil.

TRIMMING will be a continuous chore this season of the year. Trimming hedges will be more effective if done frequently so that little new growth is wasted. Trimming lawn edges should be kept to a minimum by carefully planning. Trimming up the old perennial stalks and dead twigs in the shrubs will help greatly in the general appearance of a garden. Neatness adds as much to the beauty of a garden as good plants or proper design.

Watch for signs of chlorosis in such susceptible plants as Barberry, Flowering Quince, Ninebark, Roses, Phlox and Maple trees. This is usually caused by an excess of alkalinity of the soil preventing the plant getting the necessary iron or other elements. The addition of iron sulphate, aluminum sulphate, sulphur or manure will often help this condition. Applications of chemicals under the bark or sprayed on the leaves will often give temporary relief. Improvement of the soil before planting is the best way of preventing this damage.

INSECT PESTS will often become serious at this season. Inspect your plants at least weekly for the first signs of damage. Get after the insects when they first appear or they will multiply rapidly and do a great deal of damage. All purpose sprays and dusts may be blindly applied periodically and will control most of the common insects and diseases, but it is much better to learn to know the most common pests and the proper control for them. The regular use of the powerful chemicals may often do as much harm in killing beneficial insects as in destroying harmful ones. Ants running up and down plants will often indicate the presence of aphids, and chewed leaves will indicate some beetle or worm. Keep at least one good contact spray and one good stomach poison available for immediate use. Red spiders on evergreens and many other plants may begin to do considerable damage as the weather becomes hotter.

Many things will be seen in the garden now that are not as they should be, but this is the poorest time of the year to be moving plants around. Start now to keep a GARDEN DIARY, where notes can be made of the things that should be done at other times of the year. Also make notes of the good effects seen in others’ gardens that you might use in yours.
Our State Flower is dying out!! Help save the Columbine!

WHAT GOOD IS A BIG BUNCH OF FADED WILD FLOWERS? NONE!

Wild flowers will be crushed and dead if you carry home a quantity.
Enjoy them where they grow.
Leave their roots in the ground.
Leave plenty of them to go to seed.
Then you will have beautiful mountain gardens every year.

Show the other fellow that taking an armful of flowers is stealing from his own pleasure in future summers.

COLORADO MOUNTAIN CLUB
DENVER GARDEN CLUB
HORTICULTURE SOCIETY

The above is a reproduction of an old card which was distributed about 1922 by a joint committee from existing conservation organizations. It is very appropriate to repeat it at this time.