SOMEONE YOU KNOW

---is trying to start a garden here,
---wants good garden books to read,
---is interested in getting an arboretum started,
---is interested in preserving the natural beauty of Colorado,
---wants to know what other “green thumbers” are doing.

He or she should be a member of this Association and receive “The Green Thumb” as well as the many other benefits a membership affords.

Let’s All Try

“FOR EVERY PRESENT MEMBER, GET ONE NEW MEMBER”

That is the only way we can keep up the work we are all doing and expand.

Use application blank inside.

OBJECTIVES
of the
COLORADO FORESTRY & HORTICULTURE ASSOCIATION

To preserve the natural beauty of Colorado; to protect the forests; to encourage proper maintenance and additional planting of trees, shrubs, and gardens; to make available correct information regarding forestry, horticultural practices and plants best suited to the climate; and to coordinate the knowledge of foresters, horticulturists and gardeners for their mutual benefit.

HORTICULTURE HOUSE, 1355 Bannock, Denver, 4, Colorado
TA 3410
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Gate shown on front cover leads to the attractive garden of Mrs. E. W. Hughes, Colorado Springs.

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ASSOCIATION PICNIC
The Association Picnic will be held at City Park Sept. 6, and it is for the whole family. We will meet on the north side of the museum at 4:00 in the afternoon for tours of the proposed arboretum and zoo. Supper will be at 5:00, bring your own picnic. Coffee will be provided at a nominal fee. After supper there will be entertainment at the museum. We hope this will be a large gathering of "green thumbers" who will want to see their old friends and meet some new ones.

If the weather is bad, we will meet in the basement of Phipps Auditorium.

LIGHTING AND HEATING FOR WINTER PLANTS
How many times we've all wondered just how much light and heat are necessary for growing plants during the winter months! And how many people have asked how one should go about lighting and heating a home greenhouse, or a basement plant room?

E. R. McEwan of the Public Service Company is going to answer these questions at Horticulture House, at 8 o’clock Friday evening, October 27. For those who want to know how to make house plants thrive, this talk will be most helpful. Horticulture House will open at 7:30.
IN most gardens, more attention should be given to obtaining year ’round effects. Many times we consider only the flowering effect of a shrub or tree, while the effect of the fruit may be even more distinctive and much longer lasting. Bright colored fruits or fruits of attractive shape may add interest at those seasons of the year when there are few bright flowers. By carefully arranging a variety of plants there is interest almost all the year through. There may be effects of bloom, varicolored foliage, bark, fall color and fruit.

One of the most spectacular examples of the value of ornamental fruit is the Mountainash. While most often seen as a tree there is a fine native shrub that gives all the effect of the bright orange fruit and yet stays within reasonable bounds. In comparison to the bloom of the Mountainash the fruit is many times as attractive.

Many of the Viburnums have fruit which is equal or greater in interest to the bloom. The Highbush Cranberry has longlasting red berries, the Nannyberry and Arrowwood have blue-black fruits and the Wayfaring brings another highlight when the fruit is a bright yellow. Each species varies in character and color of fruit, but generally the berries are impressive. One of the most spectacular examples of the value of ornamental fruit is the Mountainash. While most often seen as a tree there is a fine native shrub that gives all the effect of the bright orange fruit and yet stays within reasonable bounds. In comparison to the bloom of the Mountainash the fruit is many times as attractive.

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berries are in tight clusters and very jet black. Strangely they are one of the few cultivated shrubs which have berries poisonous to animals but very nourishing for fowl.

Another well known group of berry-bearing shrubs is the Symphoricarpos including the Snowberries and Coralberries. These low shrubs are commonly used for foundation plantings on the north as they do not grow tall and will tolerate considerable shade. The variety Chenaulti has attractive habit of growth and the berries are white, spotted with red.

The roses are admittedly grown primarily for their flowers yet the fruit, or hips of many shrub types are very attractive. Conspicuous among these are the Sweetbriar and Prairie Roses.

When the season is favorable, the several species of Euonymus produce very attractive fruits which hang on during the winter. These are often called “Bishop caps” and are usually pink with a protruding red berry. The Wahoo or E. atropurpureus is probably the most successful in Colorado, while the Winged fills an important place in a more dwarf shrub. The vine types, E. radicans and others often bear attractive fruits which remind one of Bittersweet berries.

Red-osier Dogwood, Cornus stolonifera

The genus Cornus includes some nice shrubs which bear a variety of attractive and persistent berries. Most common is the Redosier with cream-colored berries, but equally valuable are the Gray dogwood with white berries and the Bailey’s with blue.

The Buckthorn is a coarse growing tall shrub, but has attractive and persistent black berries. The Jetbead also produces persistent jet black berries where it has sufficient protection.

Not all attractive fruits are berries. For instance the Goldenrain tree has very attractive triangular, brown pods and the rare Bladdernut has also interesting inflated brown pods. The Bladder sena bears inflated pods which become silvery and quite attractive in winter. The hoptree’s fruits are like large silvery ammunition for capguns.

Several kinds of Sumac have attractive seed heads that persist most of the winter. The fruits of the Smoke tree and the native Mountain mahogany are fluffy and silvery but very attractive. Ninebark seedheads are dry but color up to make attractive ornaments.

One of our most versatile trees, the Russianolive, has silvery “olives” which hang on until the Waxwings.

Wayfaring Tree, Viburnum lantanum

Common Bladdernut, Colutea arborescens

Washington Hawthorn, Crataegus phaeopryrum

Western Chokecherry, Prunus virginiana demissa

There are many kinds of Honeysuckle which are easily grown and bear great quantities of red or yellow berries. These are too bitter for human consumption but the birds seem to love them. The tall Tartarian varieties are the most common, but for their other qualities the Blueleaf and Zabells are becoming more popular. The Late honeysuckle holds its berries throughout most of the winter.

Most of the Crabapples do not hold their fruit long, but many are very attractive for a few weeks or months. The Dolgo Crab is one of the most attractive as well as hardy. Some of the most attractive kinds planted in the East do not thrive here.
loosely applied to species of Senecio, Centaurea, Artemisia and Lychnis. All this does not mean that one should always refer to the Pansy as Viola tricolor, or that Gaillardia should not be called "Blanketflower"; on the contrary let us retain those familiar and colorful names, but at the same time learn to use and understand the significance of their botanical names.

Anyone who knows the botanical name of the Pansy is aware that it is closely related to the Birdsfoot Violet and that the Sweet Pea (Lathyrus odorata) has a cousin among our native wildflowers. Also scientific names are a means of identifying plants as belonging to the same group that may appear quite different. Thus, there is little superficial resemblance between our Dwarf Cornel and the Flowering Dogwood of the South, yet their botanical names are respectively Cornus canadensis and Cornus florida which dispels any doubt of their ties. Probably the fact that a knowledge of botanical names insures a familiarity of the relationship of plants is one of the most favorable arguments possible to offer.

To get an idea of the practical application of botanical names, let us take the Columbine (Aquilegia). It is easy to see that our State flower and the Yellow Columbine resemble each other greatly, therefore we place both in the same genera, but since there is a marked difference in both flower and foliage they are placed in separate species; coerulea (Sky blue), and chrysantha (Gold flowered), respectively. As in the above instances, the species (specific) name is almost invariably descriptive of some characteristic peculiar to that particular plant. Quite often variations within a species makes additional classification desirable; thus, the double flowered variety of the Yellow Columbine would be known as: Aquilegia chrysantha var. flore plena.

Gardeners with an inquiring mind are usually interested in the different genera that make up a plant family, but are somewhat perplexed by the seemingly wide differences that exist between members of the same family. The novice may wonder why the Aspen is placed in the Willow Family (Salicaceae), and only to the more advanced student of botany is the relation of the Plains Cottonwood (Populus sargentii) and the Summit Willow (Salix amygdaloides) apparent. Yet if one compares the Narrow-leaf Cottonwood (P. angustifolia) with the Peachleaf Willow (S. amygdaloides), the reason is more clearly understood, especially so, if one carefully studies other species of Poplar and Willow and notes that certain general characteristics are identifiable throughout the entire group. Further, only a cursory examination of the Snapdragon, the Gentian or the Indian Paintbrush reveals that they all belong to the same family, even though they are obviously of different genera.

To further aid the beginner, there are pronouncing dictionaries of plant names costing from a few cents up to several dollars, the cheaper ones being quite sufficient for the average gardener and small enough to be carried in the purse or pocket. Also there are several garden encyclopedias that broaden your knowledge of botanical terms immensely. Certainly no plant lover should be without these books, for the more you know about a favorite flower, the more you'll enjoy it.

Above all, don't be self-conscious about using botanical names. You will soon find the ease with which you acquire a working vocabulary of botanical terms quite gratifying.
In comparison with the benefits a homeowner derives from a fine shade tree, the cost of maintaining it in first-class condition is negligible. Barricading treatments for ailments or injuries caused by unusual circumstances, a tree needs sunshine and water, fertilizer periodically, pruning occasionally, spraying to control insects and diseases when such attacks occur, and little, if anything more. How much would it cost to care properly for a tree throughout its life? No exact figure can be given, of course, but certainly the cost of such care, prorated over the years would not be more than a few dollars annually. For money spent to keep it healthy, just what does a shade tree give in return? Certainly, shade is of paramount importance during hot summer days. Tree-shaded streets and highways are noticeably cooler and more comfortable than those exposed to the direct rays of the sun. In landscaping a new home a tree usually is placed so that it will shade the house from the hot afternoon sun. Lawns and public parks would be unattractive and little used if there were no trees present to provide shade. Trees muffle discordant noises, screen the dust from the air, act as windbreaks, take in carbon dioxide from the atmosphere and release oxygen. The presence of trees adds financial value to real estate, hence, in many modern subdivisions trees are planted as soon as the lots and streets are plotted and before any houses are built.

In addition to these very tangible benefits, healthy trees contribute to the well-being of man in many ways.

Our recent disastrous snowstorms—not so recent any more, but the results are still in evidence—have shown up a problem that is bothering a number of homeowners in particular and the city in general. What to do with the brush?

Almost every home has a smaller or larger brushpile staring the owner in his face and bothering the city officials. Only small bundles, neatly tied, can be taken in the city cleanup. Burning it is a possibility only if there is a vacant lot close by, transporting it in a car is difficult to say the least, and I am afraid the traffic department would object to the trailing of a large bundle behind a car on the way to the nearest dump.

What to do? Here is a new idea the City of East Orange, New Jersey, is now using. It grinds its brush into chips!

The Chipper will take limbs up to six inches in diameter, according to the Forester of East Orange's Shade Tree Commission, and chew them up into small chips, larger than sawdust, smaller than shavings. It is done by a roller nine inches long and almost a foot in diameter, provided with three horizontal cutting blades. At 2200 revolutions a minute it makes short shrift of the brush that is fed into the machine.

The rest is up to your imagination. Can you visualize a chipper Chipper going along the streets once a week, ringing a bell: "We'll get you out of the brush." "Take the chips off your shoulder." "Branch plant for future breakfast food," etc.

Think of Denver as the "Chip-Center" for the manufacture of nylon, plastic wood, wood-sugar, even newspaper print. These may be visionary dreams but at least I am glad there may be hope for our children, so they won't have to worry about disposing of that brushpile in the alley.

In the meantime, does anyone know of an inexpensive truckman, who will haul off mine for seventy-five cents?
TEMPERATURE AS A GROWTH FACTOR

By Alex N. Klose


No other season of the year makes gardeners more temperature conscious than Autumn. For it is during October, the Indian Summer month, that careful observers of Nature are thrilled at the sight of wedge-shaped flocks of ducks and goose winging their way toward winter quarters, above the ever-changing pageant of color which Mother Nature is displaying in the ornamental plants of the home grounds, the woods, and the roadside.

Because the change of leaf color which occurs in the fall of the year is the result of the activities of the various growth factors, thereby bringing it within the scope of these discussions, perhaps a thumbnail sketch of the reactions responsible for this grand color display will result in a better appreciation of Nature.

Foremost, the mythical Jack Frost does not paint the leaves of shrubs, trees, and other native plants with their resplendent autumn colors. Plants grown in a greenhouse, if natural conditions are duplicated, will color up just as beautifully as those growing outdoors. In fact, frost very often injures the leaves and ruins the chance of a colorful autumn.

Although not always realized or fully appreciated, the splendid hue of leaves is displayed to comparatively few people. This breath-taking review of color is evident only to those folks living in certain sections of the United States, and in a rather narrow zone which extends across Asia. While a change in appearance does occur in leaves growing in other parts of the world, the colors are limited more or less to muddy reds and dirty yellows and seldom have the brilliance of those formed in the north.

There are a number of factors responsible for the fall color array, among which is heredity. It is heredity which determines the color for each kind of tree. Red maples become a fire-engine red, sugar maples not quite as bright, and the other maples rarely produce a red pigment, and are therefore limited to a strawy yellow color.

Heredity also determines how short the days must become before a color change occurs. Here is where the growth factor light plays an important part; for, just as soon as sunlight drops to a definite intensity, autumn coloring starts. A close observer of Nature will note that this occurs on about the same date each year. Very often trees and shrubs planted in the home grounds do not color up like those found growing in their native habitat. If this is the case, check the growing location of the planting at night to determine whether a street light or a light from a building shines on it, thereby preventing the formation of a normal fall coloring.

Soil—its organic, moisture, and plant nutrient content, plays an important part in determining color and its intensity. For it is the soil which supplies the plant with the nutrients which are converted into sugars by the right light intensity on the leaf. It is only when there is an excess of sugar in the leaf that the reds and reddish browns are freely made.

Often the question arises as to why a change in leaf color does not occur in the spring of the year when the light intensity is almost exactly the same as in the fall. A brief answer to such a query is that in the spring of the year the leaves are in such an active state of growth they do not have time to make an excess of sugar.

Another growth factor, temperature, also performs an important task in Nature's color factory. For it is only during sunny days and cool nights, when the temperature is near the freezing point, that the stored starch is changed into sugar and the rate at which sugar is used by the plant is lowered. The growth factor light works hand-in-hand with temperature in bringing about the color changes which are brightest in those leaves exposed to the direct sunlight.

The growth factor moisture can very often spoil the fall showing of color. If the month of September is exceptionally wet, the leaf colors are not very attractive because the excessive amount of moisture in the soil encourages a continuance of growth in the trees. While in this active growth, the plant keeps using the sugar for its normal biological functions instead of accumulating it. In addition to contributing to the grand fall color panorama, temperature has a decided influence on all of the plant growth processes. As a result, temperature often is the deciding factor as to the kinds of plants which can be grown in a certain locality.

The chemical reactions which take place in a plant and the rate at which moisture is transpired from its leaves is directly related to the temperature in which it is growing. It is generally known that sunny days and cool nights increase their ability to dissolve various substances. Although the movement of the liquids carrying the nutrients in a plant is dependent upon more than just a simple chemical reaction, temperature does contribute to the final result.

The effect of temperature and its relation to the movement of liquids within the plant is very evident when plants are grown in an environment where wide fluctuations between soil and atmospheric temperatures occur. Some turf experts suggest that lawns be watered when the temperature of the soil, the atmosphere, and the water being applied is as nearly alike as possible.

The importance of avoiding a wide variation in the related temperatures becomes more evident when the close relationship existing between the rate of absorption by the roots, the reaction in the leaf (consisting of the exchange of carbon and oxygen from the air), the rate at which moisture is lost, and the formation of the green coloring matter (chlorophyll) in the leaf is considered.

The effects of temperature on plant growth work within certain limits—often very wide limits, is related to the chemical reactions. It has been established by plant scientists that for every eighteen degree increase in temperature, there is a corresponding increase of chemical reactions of two or three times. This might infer that a rise of atmospheric temperature will stimulate the plant into a more rapid growth. It has been shown that it takes a certain amount of heat to bring about the reactions. It has been shown that it takes a certain amount of heat to bring about the reactions. It has been shown that it takes a certain amount of heat to bring about the reactions.

In reality, and this applies to plants being grown indoors, the expression "to force" plant growth is a misnomer.
For actually, a plant cannot be forced into growth without providing all of its requirements. Gardeners often complain that they have no luck growing plants indoors. The successful growth of a plant is not dependent upon luck or chance. When the proper conditions are provided for its normal development, a plant will grow satisfactorily. In the case of house plants most disappointments result from high temperatures. These high temperatures, coupled with insufficient amounts of the growth factor light, throw out of balance the sensitive relationship which must exist for the natural growth of a plant.

Unlike members of the animal kingdom, which have a rather delicately balanced and steady body temperature, the temperature of plants follows or adjusts itself rather closely to that of the environment in which it is growing. This temperature can, however, fall below that of its immediate environment because of excessive evaporation—or, it may rise because of heat released during its normal breathing process.

There are rather definite or well-marked differences in the relationship which exists in plant growth and temperature. This well-defined temperature range is related to the original habitat of the plant. Therefore, the highest temperature at which alpine plants can be grown is obviously far lower than that which is required for a plant whose original home was the tropics. Likewise, plants which are grown indoors also have a rather narrow temperature range in which to make their normal growth. Plants whose entire growth structure is designed for a normal development under tropical conditions cannot be expected to grow under those found in the desert.

A gardener who fails to provide an environment for a plant which is similar to its original habitat is doomed to failure. The effects of wide and sudden ranges of temperature are quite pronounced in the growing of house plants. Many gardeners practice a temperature control program, probably unknowingly, when house plants are watered. Some growers of the increasingly popular house plant Saintpaulia, or African violet, are extremely cautious when watering to keep the foliage dry. Perhaps a consideration of the Saintpaulia’s original home will shed some light on the problem of watering which is actually a problem of temperature.

The history of the discovery of this perky little golden-eyed beauty is a long, interesting story in itself. The African violet, which is not a violet nor a member of the viola family, receives its name from the only country in the world in which it is found—namely, Africa. It is not, however, a violet, because violet blue color turns all other plants into white color. There is a base of plant growing near the base of some of the highest waterfalls in the world, whose roots fill the air in which the plant is growing.

All of this should suggest that the leaves of the Saintpaulia are not sensitive to water. The important relationship which exists between water and temperature in the plant’s native environment should not be overlooked. In spite of tropical rains, the leaf spot trouble of the Saintpaulia is almost an unheard of thing in Africa because the water which strikes the leaf is almost the same temperature as the leaf itself.

The leaf spot troubles of many plants are due largely then, not to the water as such, but rather to the difference of the water temperature and the leaf which it strikes. The surface leaf temperature of a plant is usually higher than that of the surrounding atmosphere. When this leaf temperature is subject to a rapid change, there is usually, as in the case of the Saintpaulia, a collapse of leaf cells. This results in leaf spot troubles. It should be remembered that it is change in temperature—not the water—which brings about this collapse. In fact, the same leaf disfigurement can occur if a cold object, such as a piece of metal, or a draft from a nearby window comes in contact with the leaf. Again using the Saintpaulia to illustrate, it has been found that an increase or decrease in temperature of fifteen degrees between that of the atmosphere and the leaf resulted in a leaf discoloration or spot.

In addition to atmospheric temperature, soil temperature also affects the final growth of a plant. Plant and soil investigations show that plant nutrients are absorbed more rapidly within certain temperature ranges or limits. Although the desired relationship between soil temperature and the absorption of nutrients for maximum growth has not been completely understood, results to date indicate that the proportions of potassium absorbed from a complex nutrient solution is greatest at low temperatures.

Soil temperatures contribute to the activity of the bacteria which contains. Though some bacteria remain active at temperatures near the freezing point, the greatest build-up occurs in an average of about seventy degrees to one hundred ten degrees Fahrenheit. This micro-organism activity as related to temperature should be considered when using organic fertilizers. If rates and time application of these materials are disregarded, large amounts of these soluble substances might be released by bacterial activity at an undesirable stage of plant growth.

The rate at which the chlorophyll of the leaf is formed is also affected by temperature. It has been found that the marvelous photosynthesis process occurs at arctic temperatures close to zero and in those of the high temperatures found in the tropics. As a rule the rate of photosynthesis increases with that of temperature, within certain limits, as long as the required balance between temperature, light, air, moisture, and soil nutrient is maintained. Until a more complete understanding of all of the growth factors and their relationship to each other is available, it is not possible to substitute any one factor for another successfully.

Do you find help for your garden problems in the pages of the Green Thumb? If so tell your neighbors about it. If you have suggestions for stories or additional information in the Green Thumb, tell us.
GATES

Gates are to the garden what a cover is to a book. They give that first impression which influences greatly the opinion of the whole garden. Originally gates were to keep out wandering stocks or uninvited guests, so were designed primarily for utility. Still they should have an appearance of utility if they are to be effective, but they may be so ornamented that they add much to themselves to the beauty of the garden.

From the self walled gardens of England years ago there was a swing in the opposite direction where there was no enclosure or privacy. Now we are again coming to realize that the pleasure received from a garden is often in direct relation to the enclosure and privacy secured. This demands gates to lead into the property or from one division to another. Here is where good taste and art may be employed to design gates which are both useful and ornamental.

Materials used for gates may vary greatly. There should be some connection in the design and material of a gate to the other features of the garden so that it appears to fit in the general plan. Where a gate is placed there should always be an apparent need for a gate. A gate set where no gate is needed may be very poor design, even though it is beautiful in itself. A rustic gate in a formal garden may be as out of place as a formal iron gate in a pasture fence. Wood in many forms and finishes can be used to make attractive gates, well designed iron gates have always been in demand and now there are many new materials which lend themselves to ornamentation through shape, texture and color.

Two gates on page from Horticulture House. Formal iron in front and friendly wooden in rear. On preceding page is shown an attractive gate separating divisions of garden on grounds of Dr. George D. Ellis, 1670 Poplar, Demer.

FUN WITH SEEDS, WEEDS, STICKS, AND STONES

Friday, October 13, will bring an evening of fun to Green Thumbers. Mrs. C. Earl Davis and Mrs. G. P. Hance will share the honors of the evening, as they show their respective methods of having fun with dried materials for winter decorations and arrangements. These two champion arrangers will bring new ideas for using odd and unusual bits of this and that to fill the spots left empty as the summer flowers bid us goodbye. At 8 o'clock sharp.

PRESERVATION OF "LIVING MUSEUMS" Sought Through Nature Conservancy Bill

SEEKING to save some of the remaining natural areas as "living museums" of primeval America for the benefit of future generations and for scientific study, Congressman Charles E. Bennett of Florida has just introduced a bill to establish a Nature Conservancy of the United States.

The Nature Conservancy is to be a voluntarily supported nonprofit organization with membership open to the public. The bill does not provide for any appropriations from the federal government.

The Nature Conservancy is designed to supplement the efforts of the National Park Service and to be an extension of the nature preservation side of the state park programs. The principal job will be to aid in the preservation of small natural areas and to help retain some of the natural features of the landscapes for public enjoyment. Local areas of special scientific, educational, and esthetic value will be given most attention.

Typical examples of many kinds of natural features will be sought out and preserved. This will usually be done cooperatively with county or state governmental agencies or with local conservation organizations, the schools, or museums. The organization also will give technical advice to landowners interested in nature preservation.

Scientists say that many of our natural features already are becoming rare and that we must save samples of them in the immediate future if we are not to lose them entirely in the onrush of civilization. The various kinds of prairie and grassland are reported to be among the least well represented by preserves, but there is equal need for saving examples of many of the desert, forest, and marsh types. Examples of geological formations such as caves and unusual rock outcrops also will be preserved under the program.

According to the Ecologists Union, these samples of wild nature are extremely valuable for scientific research. Biologists and land managers use them as experimental check areas. Other scientists need them as sources for many kinds of plants and animals that are extinct everywhere else. The areas will provide a last refuge for these species, many of which are not yet well known to science. The tracts will serve an important educational role in carrying a heritage of the past down through the years so that future generations may know what the land is really like. Children will use them as places in which to gain a first-hand knowledge of the living world.

The work of saving these natural features is already being done by a number of local societies scattered about the country. The Nature Conservancy will be a stable organization which can aid these groups in financial, legal, and technical matters. It will thus create a coordinated national program.

The Nature Conservancy will be under the direction of a board of trustees that will include elected members and representatives of the Smithsonian Institution, the National Academy of Sciences, and three federal departments.
NEW varieties of plants are introduced every year, some good, some indifferent, some worthless. Through the use of a "miracle drug," the process will be speeded up. Colchicine, the wonder worker, causes irregularities in plant cells, which can be used in producing new possibilities in plant breeding.

What is colchicine anyway? It comes from the autumn crocus, Colchicum autumnale, itself a freak in producing its lavender blossoms in fall. Long after its spring leaves have disappeared, suddenly these crocus-like blossoms appear "from nowhere," surprising the gardener who has forgotten about their existence.

Colchicine is highly poisonous—a yellowish white powder soluble in water, an "alkaloid" like morphine. Derived from the seeds and corms of fall Crocus, it used to be known as a remedy for gout; now it may lead to the development of vegetables and flowers with new tastes, odors or size. Its effect is on cell division.

Cells, as is well known, are the box-like microscopic units that make up a plant; they multiply again and again, and thus a plant grows larger. Each cell has a cellwall and a gelatin-like contents, of which the nucleus is generally well defined as a thickened knobby part. It is the important part of the cell; we now know that it contains a definite number of so-called chromosomes, which in turn contain the "genes" or inheritance carriers. By their genes you shall know a plant (or animal).

When a cell is ready to divide itself, things begin to happen to its chromosomes. After some preliminaries they arrange themselves in a central plate, called equatorial plate, and a so-called nuclear spindle is formed on either side, consisting of threads or fibers reaching from the plate to two opposite poles (see drawing).

That is only the beginning. Now each chromosome divides in two equal parts, one half for each side; the spindle fibers pull each half to opposite poles, where a new nucleus is made up of them. Then, at last, a new cell wall is formed in the loca-
tion of the equatorial plate—and then there are two cells where there was only one before, each with the required number of chromosomes.

Now let’s see what colchicine does to this, when applied to a cell ready to divide. It prevents the formation of these fibers and of a new cell wall. But the chromosomes are not stopped in their division.

The result? A new type of cell with twice the number of chromosomes, a sort of unnatural monstruity, remembering that these chromosomes are responsible for the plant’s inheritance, the gene-carriers.

When this process is continued the whole plant takes on a different character; leaves thicken, hairiness increases, the green color is intensified, flowers become of gigantic size—all because the cells are one and a half times larger and their chromosomes are doubled—yes, sometimes, quadrupled or more.

It reminds us of the time when Thomas Fairchild, the London nurseryman, produced artificial hybrids in pinks in 1719, “blushing for its work, believing it to be unnatural and immoral.” (Wright's Story of Gardening). To think that a half percent solution of colchicine (or less), applied to seeds or young shoots, can have such far-reaching effects!

Some plants after treatment grow with increased vigor even though chromosomes have not multiplied.

Results so far are slow, even though some new varieties of rye, for instance, have been produced through the help of colchicine. Even at best, plant breeding is not a hurry-up process: results are achieved only by laborious and patient scientific experimentation. But at least a new departure is at hand.

A final word of warning: colchicine, being highly poisonous, is not a thing for the amateur to play with. It should only be used by well qualified serious persons with a scientific make-up if not with a science-trained background.

CRUCIAL YEAR FOR BEETLE CONTROL

By DON BLOCH

U. S. Forest Service

If any control work is to be done, this year is the time to start.

Subject—the war against the Englemann spruce bark beetle epidemic on 310,000 acres of Colorado National Forests; date—1950. And the statement is the concluding one in the consensus report of Bureau of Entomology and Plant Quarantine and Forest Service officials who have been keeping close tab on this forest insect invasion for a decade.

“Our best judgment of the problem,” they concluded early this year, “is that unless controlled in 1950, there will be little chance of stopping the outbreak before it consumes most of the Englemann spruce and many millions of board feet of lodgepole pine in Colorado and southern Wyoming.”

To date the best estimates of the Forest Service indicate a loss of four billion board feet of timber. This includes about 400 million board feet of lodgepole pine (mixed in with the Englemann spruce stands to which the beetle has turned as it eliminated the preferred host.) Prior to 1950, some 3.9 billion board feet of lumber in Englemann spruce trees had been destroyed. At an arbitrary present price of $2 per thousand, this had a stumpage value of about $7,800,000. Indiscreetly threatened are trees containing an additional 5½ billion board feet of lumber valued at about $11 million. And, if the beetle is not eventually brought under control, trees containing 16,340,000,000 board feet may be killed, with a total loss of $32,680,000.

Originally, most of the damage was done on the Grand Mesa and White River National Forests in Colorado. In the past year, however, in a mass migration for food, the beetles flew 25-30 miles over the sagebrush and pinon-juniper covered, non-forested farmland in the Colorado river valley to new stands of Englemann spruce. On this flight, losses of beetles were heavy; and the new attacks are considered by the cooperating entomological bureau officials to be at their lowest numbers in years.

The northern division of the White River is no longer a center of infestation; the beetles have eliminated their host trees there. The infestation is now in a roughly bounded 45,000-acre area, spread along a 75-mile front extending from Rabbit Ears Pass, up near the northern border of the state to the Mt. Sopris area, about 30 miles south and east of Glenwood Springs.

The 1950 control program is concentrated on the east side of the known infested areas, particularly in the salients of apparent heaviest attack. Since June 29 this year, when Congress made available to the Forest Service a $2 million appropriation for the insect control program, 11 treating camps have been established, clustered around headquarters in Eagle and Kemmling, Colorado, and 838 out of a total working total of 1,000 men are actively engaged in fighting the beetles.

It has been necessary to construct new roads into most all of the areas being treated. Actually, some 65 miles of these roads have been constructed, under contract; and, in addition to main haul roads, about 100 miles of jeep roads, lining out the areas into blocks for distribution of men and insecticides within the treating areas, are being broken through in the most rugged terrain. Pack horses take up, where jeeps leave off, to the interior of these blocks.

Platoons of trained entomologists form the vanguard into the infested
areas: they inspect every tree, marking those that have been attacked and should be treated. Treating crews, with hand pumps, follow the entomologists spraying every marked tree. Best-known proved treatments at the moment is by the “standing tree” method, in which the infested trees are thoroughly sprayed — literally washed — from 30-35 feet above ground level, on down to the base, with orthodichlorobenzene, a 1 to 6 admixture of the basic chemical and a No. 2 fuel (or diesel) oil. Infestations 35 feet above ground are left for the woodpeckers (black and white downy and hairy varieties, which stay all winter) and are natural enemies.

The 1948 brood of beetles, which have a life cycle of two years in the attacked trees, and which up to recently had been hibernating under the tree bark, emerged beginning about the third week in June. The pests then continued their flight until August 1, with the peak being reached sometime between July 10-15. With the insects attacking during the first half of July, millions were killed while still in their galleries, and the anticipated spread materially reduced. Had the 1948 brood escaped this summer, only the 1949 brood (still under the bark) could be killed, and the 1948 brood would wing its way to enter other trees miles away from the present infestation.

Action was therefore necessary, and the work is now in full progress. Treating is concentrated on trees attacked in 1949, in order to limit new infestation in 1951 to a minimum. The beetles would otherwise emerge from these trees in June or early July next year, the entomologists and Forest Service officials agree, “and the ratio of infestation from these 1949 infested trees to new attacks next year would be about two or three to one. Beetles will not emerge from trees attacked in 1950 until June or July 1952, and it will be necessary to clean most of them up in the campaign next spring and summer.”

As of the moment, Sept. 9th, the accomplishment record indicates the project is 92 per cent completed toward an objective of 500,000 trees to be treated: in some 25,001 man-days of work, over 694,303 gallons of insecticide have been sprayed in a deadly drench on 459,742 insect-attacked Englemann spruce trees.

GREENE’S MOUNTAIN ASH

This is a fine native shrub that should be used more in cultivation. It is more frequently found on the Western Slope, though occasional specimens or groups may be seen almost anywhere at elevations of from seven to nine thousand feet elevation. They are generally growing in partial shade and where there is ample moisture in the soil. Where they are compelled to compete with trees for light they may grow up to ten or fifteen feet tall and become rather leggy, but where they are in the open they form a compact bush four to six feet tall and about that broad. They are of very neat appearance with their sumac-like compound leaves. The large flat heads of tiny white flowers are very ornamental when they are blooming in spring, but the odor is slightly disagreeable.

The real show comes in the fall when the orange fruits like those on the familiar trees cover the plant. Under cultivation this shrub grows very slowly, which is a decided advantage to the owner but discouraging to the nurseryman who hopes to sell them at a profit. They have a large but rather shallow root system which makes them rather difficult to transplant. They are propagated by seeds. Your nurseryman probably does not handle this valuable shrub but will do so if enough people ask him for it.

REQUESTS CONTINUE TO COME IN FOR PLANT DEFINITIONS

A few follow:
Anther—the pollen-bearing part of a flower stamen. Distinctly manifest in the case of lilies.
Cyme—a broad, more or less flattened flower cluster.
Glaucescent—covered with a “bloom” or whitish substance that can be rubbed off.
Herbaceous—dying down each year. Not evergreen.
Hip—the fruit of a rose.
Node—a joint on the stem where a leaf is produced.
Procumbent—lying flat, trailing but does not root.
Succulent—thick and soft in texture; fleshy, as sedum, sempervivum, etc.
Whorl—three or more leaves around a plant stem in a circle at one joint—H. F.
BOOK REVIEW

"Wild Flowers at a Glance",
by M. C. Carey and Dorothy Pitchew,
Published by Pellegrini and Cudahy, N.Y., 1950, $2.75.

"Wild Flowers at a Glance", printed in Great Britain but published in this country, should be valuable to the lover of wild flowers for the illustrations alone. Each flower described is pictured in color and its common, scientific and family name given. In addition, the derivation of the genus and species name is explained—a nice feature.

The authors have attempted to show where each plant is native and have given both the range in Great Britain and in America. Here, as might be expected, a few inaccuracies or omissions are noted. In fact, the authors seem to be more familiar with the wild flowers of the eastern United States. This reviewer, however, was pleased to see many plants illustrated which have been omitted from other books.

Among these might be mentioned "Sea holly", "Coltsfoot", some of the small euphorbias and plantains, etc.

Some of the common names given, while unfamiliar to the average American, have a charm all their own. For instance, "Codlin-and-cream", "Rest-harrow", "Lady's smock", "Lords and Ladies", etc. But to show that common names can be deceiving, witness "Cowslip", to us a member of the Buttercup family but used here, as in England, to refer to a primrose.

Altogether, "Wild Flowers at a Glance", is a book to enjoy, to find some of our common emigrants described and pictured and to make us feel that have been spending the summer out under the shrubs. Trim them or repot them as necessary, and check them for damaging insects.
SCHOOL DAYS ARE HERE AGAIN

What are your plant problems? Would you like to learn some of the answers, and better still, learn how to figure out the answers to your problems that arise from troubles with climate, soil, and selection of species.

This fall, from October 11 and every Wednesday night until December 6, the University of Denver with the cooperation of CFHA, will offer a course in "Practical Ecology," which will begin with elementary botany and go through detailed considerations of how to make the environment suit the plants or select the species of plants to fit the conditions. No previous school work in plant science is necessary, as the course will include a detailed study of how plants are put together and what makes them "tick" in the University laboratories. The only requirement is a sincere interest in plants and plant problems.

Registration will be extremely simple. Those interested in taking the course should come to Horticulture House at 7:30 p.m. on October 11, sign their name to signify that they wish to take the course and pay the fee of $12. Each meeting will be two hours long. The size of the class will be limited so come early if you want to be a member.

DR. MORA SHUBERT

HOME LANDSCAPING can be learned the easy (?) way by attending Mr. Pesman's class on Friday evenings, 8-9:30 at 208 Barnes Bldg.

It is given by Colorado University Extension to fill the need of so many home owners and people in landscape work. Bring in your personal problems for help and discussion. Study plant material as it grows. Meet congenial garden lovers.

Do they sound like sales talk? Well, last fall's class did not think so; they had a good time and were able to learn a lot about how to solve their own garden problems.

Don't attend if you know all the answers anyway,—because the rest of us don't... But we are trying to learn.

Question—How deep should seeds be covered with soil? A new Gardener.

Answer—From two to three times their own smallest diameter. If sown early or in clay soil, cover somewhat less than normal depths. H.F.

Question: After Peonies bloom should the foliage be cut down immediately?—J. L. Wheatridge.

Answer: Remember that any plant's substance is built up by the action of its foliage. That's what the leaves are for. Therefore do not cut the foliage any more than is necessary—it should be left on until the last fall clearance in the garden. No harm in leaving the tops all winter, but at all events leave as long as possible. The foliage will fall outward and make an automatic mulch just where the mulch is needed—around and not on top of the crown.

Questions and Answers

Question: I am planning now, to later mound the soil around the base of my rose plants. How shall I do this? Dr. B., Boulder.

Answer: It is not the best way to hoe soil from between the plants. This is likely to expose the roots. It is necessary to bring in additional soil from outside or from some other part of the garden. This soil must be taken off again in the spring, when frost is out of the ground. Make the soil mounds 6, 8 and 10 inches high.

Question: I have a privet hedge coming on around my new home. I do not know what form I should follow in the trimming. Mrs. L. K., Lakewood.

Answer: If the hedge be appreciably wider at the top than at the bottom, it holds the snow in winter and this is apt to break the bushes apart. It also prevents moisture from reaching the roots and the sunlight from reaching the lower part of the plants. For these reasons a hedge trimmed straight up and down or with a wider base than top is better than one of a wedge shape.


Answer—The Delphinium has two long-honored companions, the Madonna Lily and Lilium croceum. You may like also the charming foil of the meadow rue, Thalictrum glaucum with its lovely gray leaves and puffs of pale yellow bloom. Sometimes try Thapsis and Campanula latifolia macrantha, rich purple or pure white. This latter blossoms first but often stays to make an interesting association.

H. F.
in the summer ready to grow into the new stalks in the next year. They are stored full of starch like a potato and are crisp and juicy. The older stems at this time contain a little starch but are tough and ropey.

It is a wet and muddy job to dig these roots but enough to provide food for several days can be dug in a few hours. Those who would try these out should be cautioned that many modern-day swamps are filled with sewage and it is not safe to eat the roots that are grown there unless they are thoroughly cooked.

The cattails furnished other valuable products for the Indians. The down from the ripened heads was gathered to use as a soft packing for the Indian babies in the cradle-board. The leaves were used to tie things together as we use rope. Modern gardeners use mats made from these cattail stalks as insulation for their hot beds. The construction of the leaves is such that there are many air pockets which provide insulation from cold or heat in an efficient way not equalled by synthetic products.

Your granddad will remember the cattail only as a handy torch when soaked overnight in kerosene, but someday it is possible that some of these uses that the Indians made of them will come back into style again. Swampy ground that is unsuitable for other use might produce much food.

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**FOR CHILDREN OF 8 TO 80**

**CATTAILS**

If one were compelled to live off the country in Colorado, I know of but one plant that would provide them with nourishing food for any great length of time. That is the cattail which commonly grows in swamps. It was one of the principal vegetable foods of the Indians which the white people have not as yet learned to use commercially.

The new shoots from the old plants are about the size of a man’s finger and sharp pointed. These are formed

---

**OUR FALL BULB FOLDER**

**IMPORTED BULBS**

Tulips, Daffodils, Hyacinths, Crocus

**Write for Our Fall Bulb Folder**

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**Reserve January 2 and 3 for the Horticulture Conference**

Plans are going forward for the biggest and best conference yet in 1951. We will start the new year off right as we get together in Denver University’s new classroom building to learn of all the good things in gardening both old and new.

There will be sections for commercial men where all the new techniques are explained and simultaneous meetings for the dirt gardeners who will want to know “how to do it.” The annual dinner of the Association will be held the first evening. This is the big yearly get-together for all those interested in trees and flowers.

Tell all your friends in the Rocky Mountain area about it.

**What Does YOUR Membership in**

The Colorado Forestry and Horticulture Association **Mean?**

It means your support of a worthy cause, for the Association is working for: the preservation of the natural beauty of Colorado; by the protection of her trees, wildflowers, other plants and wild life; the proper maintenance and additional planting of gardens, flowers, shrubs, and trees in all communities; the establishment of a State Botanical Garden or an Arboretum; roadside parks, state parks and botanical reserves throughout the State; the publication of a magazine devoted to correct information regarding forestry and horticulture practices; plants best suited to the climate; coordination of the knowledge of foresters, horticulturists and gardeners for their mutual benefit; a connecting medium between the association and the member.
OCTOBER GARDENING

LAST spring, how you envied your neighbor's fine display of tulips, narcissus, hyacinths, and other early blooming bulbous plants. You should learn that these things must be planned for in advance and the bulbs planted in the fall. As early as you can get the bulbs from your seedman is time to plant them. Don't wait too long or you will not be able to get a full assortment of colors and snow may catch you before the bulbs can be set in the ground. In this Rocky Mountain country it is well to plant them a little deeper than the usual directions—tulips at around 10 inches. If they do not have the full sun, such as on the south of a building, they usually grow larger and last longer. Tulips planted deeply will not "run out" or divide so quickly, and it is less dangerous to plant shallow-rooted annuals over them.

Peonies, bleeding hearts and many perennials that have stopped blooming may also be moved in the fall. Prepare the ground thoroughly as they like to be left alone for many years.

This is clean-up time. Remove the old, dead stems of perennials and annuals, trim the scraggly hedges and edge the lawn around the shrub groups. If gardens are laid out with proper lines and contain a sufficient proportion of the appropriate intimate features they may be beautiful all the year around, even when no bloom or even green leaves are visible. Neatness is most important when there are no brilliant flowers to catch the eye. It is not good taste or necessary to expect the garden to be as immaculate as the living room rug. A few leaves blowing around look natural and will help protect the roots of perennials and shrubs. Save all the leaves and smaller stems possible to add to the very important compost heap. Burning leaves may be typical of fall but it is a wasteful and unnecessary practice. This composted material is very important for spading into the soil or as a mulch over the top. It is Nature's way.

Lawns may be successfully planted any time from the middle of August to the middle of October, in most years. Old lawns may be patched up also at this time. The days are warm enough to allow the grass to grow, but the nights are cool, making it less difficult to keep the soil moist and weeds are much less of a problem. Prepare the soil thoroughly before seeding and get the best possible seed.

Another fall job often neglected is the spraying of Dogwood, Snowball and Euonymus just before they drop their leaves. The aphids which do so much damage in the spring are at this time on the surface and easily killed, if you will remember to go after them.

Use the same good judgment in watering now that you have used all summer. A sudden change from watering every other day to no water at all is not good for plants. They should not be stimulated into rank growth by watering late in fall, but the nights are cool, making it less easy to keep the soil moist and weeds are much less of a problem. Prepare the soil thoroughly before seeding and get the best possible seed.

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The Colorado Forestry and Horticulture Association
Treasurer, 1355 Bannock St., Denver 4, Colorado

I hereby apply for membership □ renew my membership □ which includes without additional cost a subscription to "The Green Thumb" and many other privileges and benefits.

I enclose annual dues for the (calendar year) (last half) 19... (check kind) Supporting, $3.00 ( ); Sustaining, $5.00 ( ); Contributing, $10.00 ( ); Patron, $25.00 ( ); Donor, $100.00 ( ). ($2.50 of which is for subscription to the Green Thumb) Balance of this year at half price.

Name

Address
SOMEONE YOU KNOW

---is trying to start a garden here,
---wants good garden books to read,
---is interested in getting an arboretum started,
---is interested in preserving the natural beauty of Colorado,
---wants to know what other “green thumbers” are doing.

He or she should be a member of this Association and receive “The Green Thumb” as well as the many other benefits a membership affords.

Let’s All Try

“FOR EVERY PRESENT MEMBER, GET ONE NEW MEMBER”

That is the only way we can keep up the work we are all doing and expand.

Use application blank inside.

OBJECTIVES

of the
COLORADO FORESTRY & HORTICULTURE ASSOCIATION

To preserve the natural beauty of Colorado; to protect the forests; to encourage proper maintenance and additional planting of trees, shrubs, and gardens; to make available correct information regarding forestry, horticultural practices and plants best suited to the climate; and to coordinate the knowledge of foresters, horticulturists and gardeners for their mutual benefit.

HORTICULTURE HOUSE, 1355 Bannock, Denver, 4, Colorado TA 3410

FALL FRUITS FOR COLOR
TEMPERATURE AS A GROWTH FACTOR
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