The Green Thumb

JUNE, 1948
ORCHIDS TO MR. S. R. DE BOER

Philosopher and community plan-
ner, Mr. S. R. De Boer has brought
this City and State the heritage
of his splendid training, his broad
ion and his unselfish devotion to
ideal of service.

A visit to his office—and we see
City of the future grow nobly
before us, its free-ways for the pu-
ise traffic, its integration of parks and
lustries, its unique plantations of
ive and imported specimens.

Then suddenly we realize that
ny of these charts and maps before
have become realities, that he who
de them walks daily through the
y of his dreams. He has lived to
the fruits of his labors in the
h of the blossoming crabs on
erry Creek against the dark back-
und of great evergreens grown so
over the brief years; in the recrea-
on of a lovely old Virginia garden
one of the city's parks; in the arr-
es of traffic, the boulevards and
ygrounds which have taken form
der his hand.

As a member of Denver’s original
stry Group, as a Director of our
sent Society, still one dream re-
ins to be fulfilled by S. R. De
er — the Botanic Garden he first
v the need of so many years ago,
ith its research laboratories, its ex-
imental plantings and its acres
king West to the great Range.

Probably no other person has had
great an influence on the horti-
ture of the Rocky Mountain area.

ROSE SHOW
The Denver Rose Society an-
ounces that they will hold a rose
June 28 at the Garden Center.
embers of all garden clubs or sim-
r organizations are invited to view
a display, from 2 to 9 P.M.

JUNE SCHEDULE
June 6 — The Colorado Mountain
Club’s annual tree planting day.
Meet 7 A.M. at Denver Public Li-
rary. Register with the C.M.C.,
TA 0677.

June 12-13 — Overnite trip to Blue-
bird Lake to see birds and wild-
flowers. Leave Horticulture House
at 4 P.M., Friday. Bring sleeping
bag for overnite at Wild Basin
Camp.

June 17 — Colored motion pictures of
“Plants in Action” by John Nash
Ott. Shown at Phipps Auditorium,
City Park, 8 P.M. Admission
$1.00.

June 20 — Trip to Deer Park Creek,
led by Moras Shubert. Leave Horti-
culture House at 8 A.M. Bring
lunch and rain jacket.

June 27 — Bus trip around Denver
Parks. Leave Horticulture House
at 2 P.M.

Call Horticulture House a few days
in advance so arrangements can be
made for transportation, and fur-
ther instructions can be given.

No Friday evening meetings in
June.

THE FIRST EXPLORATION
TRIP FOR 1948
Four enthusiastic botanists spent
four days collecting herbarium speci-
mens and exploring in the southeast
part of the state May 2-6. About
120 specimens were collected, some
of them rare. The suggested loca-
tion of a state park south of La Junta
was scouted. The date was a little
early to expect to find a great variety
of plants in bloom, but some of those
found might not have been available
a few weeks later.

Cover Picture of Pikes Peak Across Park,
Colorado Springs
Photo by Harry L. Standley

SPRAYING IS NOT A SIMPLE OPERATION

It is a highly technical operation requiring
a knowledge of plant diseases, insects and in-
secticides. Each pest, each plant and each
season requires a specific type of treatment.

Many pests are attacking the trees of Den-
ver which can be controlled by the proper
sprays properly applied.

We have a new spray machine which we
believe to be capable of applying spray ma-
terial properly to any tree in the city or sur-
rounding country.

We have had wide experience in handling
spray materials.

Call us for advice. We will tell you if your
trees do not need spraying, and will advise
you what treatment is best if they are attacked
with any disease or insect.

Swingle Tree Surgery Company
Member, National Shade Tree Conference

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ASSOCIATED FORESTRY AND
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SCHULHOFF NURSERIES
Roses — Shrub, Floribunda and Hybrid Tea
Evergreens - Shrubs - Trees - New Lawns
Grading - Plowing - Flagstone - Tree Pruning
and Spraying - Perennials and Rock Gardens

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CONTRACTING CO.
PAUL BRADFORD, DESIGNER AND CONSULTANT
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Evergreens - Shrubs - Trees - New Lawns
Grading - Plowing - Flagstone - Tree Pruning
and Spraying - Perennials and Rock Gardens

665 Clermont St. Denver 7, Colo. TA 8038
SEE PLANTS GROW

John Nash Ott, Jr.

for the use of the hall, the cost of the free showing to children in the afternoon, and (we hope) give the association a sizeable surplus to help in promoting future activities.

GET YOUR TICKETS NOW

Members should secure their tickets from Horticulture House at once if they do not want to be disappointed.

PLANTS IN ACTION

By John Nash Ott

Phipps Auditorium, in City Park, June 17, 8 P.M.

ANNUAL PICNIC OF THE ASSOCIATION

6 P.M. IN CITY PARK, WEST OF THE MUSEUM

(Indoors if bad weather)

Everyone Bring Their Picnic Supper  Coffee Served Free

Free Showing of the Picture for Children at 3 P.M. the Same Day
COLORADO NEEDS A NATURE PROGRAM

By Paul W. Nesbit and George W. Kelly

"It is a natural." Our mountains form an intriguing, ever-present backdrop and furnish many of the eden properties. We, the actors on stage, may make use of these props for absorbing activities; trails for hiking and riding, streams and rivers for fishing, peaks for climbing, rocky slopes for skiing, soil and sun for gardening, beauty spots for picture taking and wilderness for camping.

We in Colorado have an unsurpassed combination of the raw materials from which to develop the finest outdoor recreation pursuits. Rugged peaks and quiet meadows; rounded hills and waterfalls; forested slopes; fascinating wildlife; fertile valleys and rippling water; warm sun and cool air are all combined here for way and there another with insite and enticing variety with over 1,000 delightful sky and invigorating imate bolstered by the effects of altitude. These unusual properties are to our great advantage. From them we may build satisfying and wholesome activities which we may share in sharing with others, but must carefully guard them from spoilage. We of Colorado need to develop a greater appreciation of our mountains and their advantages.

Appreciative visitors are good for us and good for our business. Visitors who really find these varied and delightful interests will want to come again and to stay longer. Our visitors would be more interested in our mountains if our own residents with whom they come in contact had more appreciation themselves. All of this would result in better use and care of our natural resources as well as in improved human values.

With growing interest and ease of travel, regions where Nature can best be appreciated should draw increasing numbers of visitors from among those who tire of artificial city life. Colorado is well situated to draw from a large, well populated area where there is too much summer heat and humidity and too few natural features of interest. Being host to so many visitors, we need to make our home grounds, our cities and our whole state more attractive to them.

Colorado can better take advantage of this situation if it is better able to interpret its mountains both to those who are already interested in Nature and also to those who are quite unaware of the benefits to be derived from anything outside of four walls. Some of our summer visitors who come from the plain surroundings of the plains long for our mountains between seasons and return year after year with greater appreciation than most Coloradans. Others are new in a strange land and vaguely regard our mountains as beautiful but turn for their amusement to the same old pursuits and gadgets of city life.

It is mountains which bring them but Main Street gets their attention and, since our Main Street is not so different from theirs at home, they have little to tell about which will enthuse their neighbor. We need to capitalize on our mountains for that is the feature in which we are supreme and outclass our neighbors. Other visitors rush about to make the drives and get on to another region. They probably live a sedentary life of nervous tension at home and get the same sort of vacation. They need to get out on the trails and pump fresh blood through their livers instead of going home with their vital organs all stagnated behind a driver's wheel, just as it is cramped as they sit in the office. They all need to be educated as to what to do while they are here. Furthermore, even though they can not climb mountains at home, they may be able to get ideas for doing some good exhilarating outdoor gardening when they get back.

The desired appreciation of mountains is based largely upon experiences in them and understanding of them. Experiences come from doing different things in the mountains and one who appreciates them is continually searching out new undertakings from among the unlimited possibilities. One gains knowledge, and even inspiration from his experiences and also may gain it from others, especially from good leaders and from writers. If we see that our residents have more understanding and appreciation of our mountains, then they will become helpful boosters.

The development of greater appreciation of our mountains is worthy of the effort of a special program. This may be called a "Nature Program," the term Nature being broad enough to include all that may be desired. A Nature program is not of necessity confined to birds and bugs and flowers but may include the whole outdoors—as big as the mountains and all of the things that go with them. It should be broad enough so that everyone may find in it something to interest him.

With regard to the development of a Nature program, Colorado is behind many other states where there is much, much less of natural interest to be found. It is probably still true that we are the only state without state parks. Some have many parks and roadside park systems which adequately provide for the needs of their residents and their visitors and have suitably marked points of scenic, historical, geological or botanical interest. Some states and several cities provide free nature guide service. Many communities have inaugurated valuable programs of Nature appreciation in all grades of their schools.

To some extent a Nature program is one of the objectives of groups within the state such as schools, certain tourist businesses, sportsmen's organizations and state or federal agencies. Since emphasis on Nature, however, is secondary in all these groups.
A program needs a unifying and coordinating influence. A Nature program for Colorado should include a survey of the interested people, organizations and leaders; what they have done or planned to do. There should be an organization to coordinate Nature efforts and collate the available information and ideas. An effort should be made to secure the cooperation of the newspapers, museums, city and national parks and other facilities already set up. School authorities might be induced to give more local Nature study and arrange more field trips, outdoor work and summer recreation programs having to do with Nature. Upil health is an important outcome of more outdoor work. Not only does youth need Nature but the seeds sown during these impressionable years will bear much fruit later. Organizations such as Boy and Girl Scouts, Campfire Girls and various religious groups should be given more encouragement and technical assistance in their hiking, camping and Nature study programs. Resorts and tours should be encouraged to develop more activities leading to a variety of mountain experiences.

In order to have schools, camps and resorts take part in a Nature program, there must be made easily available, in accurate and simple style, literature and visual aids which will serve to interpret our Nature and our mountains and which will arouse interest in conserving our national resources. Our state department of education and other state agencies might do more along this line. In order to have teachers, recreation leaders and tourist guides who can interpret Nature, we need a training program for leaders. Our teacher training colleges need to develop more courses dealing with elementary Nature study and Nature recreation. Summer camp and courses are particularly valuable for this.

A development of greater appreciation for our natural resources will pay dividends in many ways. Colorado may well top the nation some day in outdoor recreation. The stage is set. We Nature enthusiasts must act.

### WE NEED HELP

Do you know of some one who would like to help us at Horticulture House for part or full time? An interest in horticulture, ability to use a typewriter, a desire to help people who phone or visit the house and a little ability to do clerical work would help. A small amount for salary is available.

### DIRGE BECOMES DANCE

The daylight darkens into night,
The wind blows fresh and cold;
Earth's joys elude our dimming sight,
And we are old.

Our youth becomes a faded dream
That mocks across the years;
Tomorrow is a thinning gleam
That tells new fears.

Our old-time visions lie about,
The rags of dreams that were;
Life's altar is a shrine without
A worshipper.

There are no further goals for us,
Who now are weak and faint;
We mark the sexton's holes for us
Without complaint.

O, come, dismiss the graveyard muse;
Life's still a corking show!
It's spring; put on your hiking shoes,
Let's go!

HILERY HECHT
Contributed by Anton Senekowitch.

### GARDENING FOR THE BLIND

Agriculture as a vocation is a strong contender for one of the most appealing occupations for the blind. For some time reports have been received of blind and visually handicapped people who have made a success of farming. Many tools and implements have been designed and developed to help them overcome their handicap.

Schools for the blind, as early as 1908, started giving pupils instruction in gardening. They taught the cultivation of flowers as well as vegetables and many blind people have had much satisfaction in continuing this pursuit. There is a story of a blind man who planted a garden and did a nice job of it too, but his rows of turnips were pretty crooked. When chided about it he straightened up from his weeding and said, "you can get more turnips in a crooked row." He was not discouraged.

With the new gardening tools perfected by Professor Hugh Findlay of Columbia University around 1944, however, there is not much chance of planting a "crooked row." These tools are the same as used by sighted gardeners with simple devices attached to them.

The hoe and rake have a snap welded to them much like that used to snap a leash to a dog collar. This can be snapped on a wire stretched between the rows, enabling the gardener to cultivate or hoe a straight row; this device can be attached to a five-pronged cultivator as well. There is a depth gauge made for the hoe or spade which is helpful in making rows for the small seeds. With this gauge you decide how deep you are going to plant your seed — set the gauge on the hoe and you can't dig deeper.
THE TULIP

LESLIE F. PAULL

ALTHOUGH botanists have described more than 100 wild species of tulips, the origins of our garden varieties are unknown. The wild species are distributed among more than two dozen countries of three continents. Roughly speaking, two thirds are found in Asia to one third in Europe, with a small allowance out for five species found in northern Africa.

A more detailed study of distribution reveals or suggests some interesting matters pertaining not only to the origin of garden forms but their habits as well. Plotted upon a map of the world the area of distribution of the wild species would show the vague figure of a widely extended mouth, open on one side—the Mediterranean Sea; badly swollen on the other—Western Asia. It is upturned in the west to allow for England's one species. The lower lip—Africa—is very thin; the upper lip—Spain, Portugal, Southern France, Italy, Greece and Turkey—rather thick. In Asia it actually has the mumps! Asia Minor and the countries of the Levant boast 24 species, with 36 more centered in Turkestan, Bokhara and Persia. All of these regions seem to be hot countries, yet we know that in our relatively mild Southern States tulips are a failure. I have not available the data to show in most cases the ecological conditions under which the species thrive. In a few instances, however, we get some inkling—such as in the Swiss Alps, Himalayan Mountains and Daghestan Highlands. It seems likely that in these cases they are plants of mountains and highlands, receiving ample moisture during their growing period and living (from other references) in poor soils.

The Western world paid little attention to its wild species but the Arabs and the Saracens and possibly the Persians in the early centuries did plenty with theirs. We have no actual proof, as they preserved no records, but we do know from their poetry and other writings that they were flower lovers—the gardeners of western Asia. They must have been at work on the improvement of the tulip for untold generations before it appeared on the European scene. Not until 1554 was the Western world made aware of these developments. The Austrian ambassador to Turkey then observed many varieties growing in the gardens of Constantinople, yet we do not even know when and where the Turks got their start. Returning to Vienna, the ambassador brought bulbs of choice varieties and others were secured later. In almost no time at all their culture spread over western Europe.

The arts of printing and engraving were turning their attention from making religious books to making herbals devoted to the art, if not the science, of medicine. In many of these were crude engravings of the tulips of the period. It is of interest that in all the varieties illustrated there are none with rounded sepals. It remained for the Dutch to develop these at a later period. We still preserve a few of the type with pointed and reflexed sepals in the Lily group.

It didn't take long to discover that the ideal conditions for growing tulips existed in Holland, Belgium and Northern France; also somewhat later in England. These countries still remain the greatest source of supply. Only in our Pacific Northwest are there comparable conditions. In the Low Countries tulip production speedily became "big business". New variety succeeded new variety. Prices soared and speculators made fortunes without ever owning a bulb—also lost them as easily. This "boom and bust" craze endured from 1634 to 1638. Once over, a few Dutch and Flemish growers settled down to the more serious business of quantity production and even more to the improvement of the existing varieties.

Little was known of artificial hybridization; dependence was upon natural variation and selection according to certain standards that they themselves set up. These standards, however, varied in the different regions. The Dutch ideal became a globular flower with rounded sepals and in solid color. They also worked for longer stems and a later blooming season. Eventually this was to become the Darwin type although it was in the process of development nearly two centuries before Darwin was born.

Meanwhile some growers, especially the Flemish, were utilizing the discards of the "standard" growers. They broke away chiefly in the matter of pure colors in favor of bronze and mixed colors, thus becoming responsible for the Breeder type. They preserved the freaks that the big growers scorned; thus the striped forms and the Parrots came into being. During the same period the early lily types had become popular in England. They became cheap, plentiful, and, freely purchased by the middle classes, they were soon a feature of the small home gardens in town and country. English gardeners began to work on their improvement but with very different ideals. They preferred a long, slender flower and lighter colors—yellow, lavender and white. They also wanted them taller and later blooming. Thus was developed the Cottage type, so named because of its association with the little homes of England.

With all these types achieved we came to have an April-flowering group of the older types and a May-flower-
A group of the improved varieties, with a gap between. Since the turn this century, with great advances ade in the science as well as the art breeding, it has not been difficult fill this gap but in turn this has rided to obscure type distinctions. still seems desirable to point out e paths along which development is travelled.

Types

DARWIN. May-flowering: very ll: form globular with rounded pals: colors solid, more often dark an light, (a few in white and yel-

COBBAGE. May-flowering: tall: rm enlongated or oval: tips of sepals rious: color more often in tints than shades, (white and yellow very mon).

BREEDER. May-flowering: very ll: form globular with rounded pals: colors modified with bronze nes or overlaid with heavy bloom.

COTTAGE. May-flowering: tall: rm enlongated or oval: tips of sepals rious: color more often in tints than shades, (white and yellow very mon).

SINGLE EARLY. April-flower-

TRIUMPH, Inc. MENDEL. Hy-

WILD SPECIES. Only relatively few are offered to the trade and most of these are rock garden desiderata. The cream of these, out of about a dozen I have grown, are: The Water-lilly, T. kaufmanniana. The English Tulip, T. sylvestris. The Candystick, T. chusiana.

Editor's Note: This unusual article is so long that it is impossible to use it complete in one number of the magazine. So we are reserving the portion concerned with tulip culture, planting, etc. for the October or November issue.

The cream of these, out of about a dozen I have grown, are: The Water-lilly, T. kaufmanniana. The English Tulip, T. sylvestris. The Candystick, T. chusiana.

THE WEEK-END GARDENER

LAST week all my trees and shrubs were leafing out fine and there seemed to be nothing to prevent their growing along indefinitely with no care. As I got out of the car this noon I saw that there were aphids on my dogwood and the weeds in the perennial bed were almost covering the ground. I guess that it is time to roll up my sleeves and go to work. I should remember from last year that it will be ten times the work to get rid of the weeds in a few weeks time. When they are small it is easy, but later they get well established and it is really work to get them all out. I wonder if there is not some easier way to get rid of them than by hoeing. I am going to try a heavy mulch on part of the garden, and I think that I will experiment cautiously with 2,4-D where the weeds are out by themselves. The Oldtimer says that the time to fight them is in the late fall just as the leaves are about to fall. Then they are in the open and easy to hit.

My neighbor told me today that all her fine variety of gladiolus had turned out be of a small sickly pink variety. I don’t see how they can do that. I'll ask the Oldtimer. He says that what has happened is that many of the finer “glads” have not produced new bulbs and bulblets, and that the older varieties with more natural vigor have produced a greater number, so that within a few years they appear to have “gone back” to the smaller and harder varieties. Many of these “impossible” things can be readily explained when more is known about how plants grow.

FRAGRANT PLANTS

This list is not intended to be complete either as to varieties or nomenclature of those mentioned. It is merely suggestive and anyone who cares to may make many additions about which we would be glad to hear.

EVERGREENS: Balsam Fir, Pinyon Pine, Rocky Mountain Juniper, other evergreens to varying ex-

TREES: Balsam Poplar (buds), Walnut leaves, Linden flowers, Russian olive flowers, Wild crabs (especially Malus coronaria).

SHRUBS: Mountain spray (Holodiscus), Hoptree (Pelela), Skunk-bush Sumac (Rubus trilobata), Sweetbriar Roses (Rosa rubiginosa), Flowering Quince (fruit).

HERBS: Thyme, Lavender, Rosemary, Germander, Sweet Marjoram, Artemisia (sage), many mints, Catnip (Nepeta mussini), Achillea, Tansy. Also fragrant leaved flow-

FLOWERS: Nicotiana, Abronia, Clove Pinks, some Iris, Bergamot, Mignonette. Common flowers such as roses, violets, nasturtiums and sweet peas.

FLOWERING SHRUBS: Roses, Lilacs, some Mockoranges, Autumn Clematis, Hall’s Honeysuckle, Flowering Currant, Elderberry.

Read Louise Beebe Wilder’s book, “THE FRAGRANT PATH.” Half of the things recommended will not grow here but many odd things are suggested which it might be worth while to try.
ESPALIERED TREES, SHRUBS AND VINES

Jessie M. Nevills

If you need something new in the garden, try the ancient art of espaliering. "Espalier" is a French word meaning trellis. Espaliering has been practiced in Europe for many ears. It was popularized in America at the World's Fair in New York.

Where space in the garden is a factor, an espaliered tree is the answer.

Fruit trees that can be espaliered must be grafted onto a dwarf root stock and are higher in price than their fruit trees. The older the tree and the more trained arms, the higher the price. They are a bit difficult to find for Colorado as we are quarantined against fruit trees from many eastern states. I found a nursery in Washington state which can supply apple, pear, sweet cherry, peach, plum, and prune. I chose an apple and a plum, thinking they would be more hardy than the others. There are some espaliered pear trees, near Denver, on the east side of a wall, which have been there many years. Apricots and nectarines are offered by some eastern nurseries; they could be used on the Western slope in the peach country.

Trees may be trained against a wall, although a wire frame should be used to keep the tree a few inches away from the wall to insure circulation of air; the tree should be at least six inches from the wall. The horizontal wires should be placed ten inches apart and the arms, or branches, ten inches apart on the trunk of the tree. Fasten the branches to the cross wires. I believe that the warmth of a south wall would bring out the buds too early in our hot spring sunshine; another exposure would be better.

My trees came in excellent shape, fastened firmly to a frame. The grower had attached a note asking me to let him know in what condition the trees arrived as Colorado was the furthest point to which he had ever shipped them. The apple was a trained six-year-old tree, about six feet high and in three fold U form. I am training it into a four fold. The plum lost a branch or two the first winter but I am training branches to take their place. I have not been able, however, to make my turns as nearly a forty-five degree angle as the nursery trained branches.

A young gardener would enjoy buying younger trees and training the branches from the beginning. If you start with a "whip" you must decide how wide a spread you want as the two outside lowest branches are grown first. Ten inches higher on the trunk allow two more branches, or arms, to grow. Another ten inches up the trunk allow two more to grow and so on until you have the desired number of arms. If you should find a fruit bud at the end of an arm before the desired length has been reached, nip off the bud and the branch will continue to grow. To keep an even balance, prune the branches on either side to the same length. It takes zeal and constant watching in July, August and September when you do your pruning to cut back all shoots four inches long to two and one-half inches. When the tops are as tall as you wish they should be cut to three buds of each year's growth.

I have used my espaliered fruit trees as a screen between two lots. There is an eighteen inch wall; seven-foot iron pipe posts, drilled by holes every ten inches, and set at intervals. The horizontal wires are stretched through the holes.

The posts and wires, without the wall, are very effective on the side of a building. They can also be used to frame a summer house, or a large window.

As the root system of espaliered trees is very small and as they are usually placed near a wall they will need frequent watering in Colorado. They like best a slightly acid soil so it is well to work in two tablespoons of sulphur every year. Add a pit of peat moss when setting out the tree but fertilize only moderately as you do not wish to encourage too vigorous growth.

Other shrubs and vines can be trained on trellis or wall and trimmed to the pattern of the espalier. They are not grafted to dwarf stock but used as is. Grape, firethorn, flower-
Richards' Roses
... incomparably better

There is Nothing Like Them in This Region!

Already planted and started for you, Richards' Roses are growing in large pots in specially-prepared soil, fertilized to insure rapid and permanent growth and bloom. The acquisition of about 160 pounds of the finest rose soil with each dozen roses purchased entirely disposes of all questions as to the adaptability of your garden soil to growing roses and insures success the balance of the season.

Planting in Your Garden Is Reduced to the Ultimate in Simplicity and Ease! You Can't Fail with Richards' Roses

Richards' method of handling roses is no experiment but proven best after 9 years' experience with many thousands of plants. Times without number customers who one year timidly tried one or two have come back again and again, buying one to five dozen at a time. They will never again be satisfied with old-fashioned naked-root plants. Neither will you, once you try Richards' Roses.

PLANT NOW! IN FULL BLOOM!

95 varieties finest 2-year budded field-grown hybrid tea roses (including all 4 AARS for '48), polyantha roses, climbing roses. Drop in soon and see a wonderful show and select your roses while we have an excellent supply. (For sale only at our gardens—cannot be shipped.)

Northern Colorado's Garden Center

RICHARDS'
at the end of West Mountain Avenue

FORT COLLINS, COLORADO

In Richards' new greenhouses and in Colorado's finest garden store; SO MUCH to make outdoor living and your gardening less work and more fun!
THE GREEN THUMB

THERE IS LIFE IN THE SOIL

THOMAS L. MARTIN
Agronomist, Brigham Young University, Provo, Utah
Extracts from Speech Delivered at Rocky Mountain Horticultural Conference, Denver, Colorado, February 3, 1948

O UR western soils are young. They are not fully developed. Over the centuries, during the soil-forming processes, plant foods accumulated and, in a way, have been stored in the soil. When men broke up these virgin soils these vast stores of food elements were released. The farming of these soils caused the food material to be used up to the point that artificial fertilization became necessary to meet the growing crop needs. This artificial fertilization, however, does not always provide all the chemicals needed. Nitrogen, phosphorous and potash are there in abundance but are in such a pure state that the other minor elements such as zinc, boron, sodium, etc. are lacking. The crops, even though they may have the proper bulk, lack the essential health elements. Hence, health problems enter the picture and are usually associated with soil degradation.

The work that is needed is that of making more soil. The undecomposed part of our western soils is rich in unavailable substances. One can make them available by using more barnyard manure, green manure and by growing humus-building crops. This is the kind of fertility towards which one must strive. Manures and more manures are needed for better temperature, decreased erosion, soil granulation, ease of workability, food for bacteria and better quality of fruits and vegetables. Of course, commercial fertilizers have their place and must be used, but for best results, used as a supplement to organic matter.

The crops produced by such a system make man and animals thrive. The turkey grower tells us that when their flocks are fed grain from manured land they are healthier, more vigorous and more resistant to disease than when fed grain from land that has been fertilized with commercial fertilizer only. Rabbits grow twenty percent faster when fed plants grown on manured soils. Grass seeds are higher in vitamin B content than seeds grown on land treated with commercial fertilizer. There are many explanations for this but one reason is that the putrefactive process in animal intestines causes greater growth-promoting substances to accumulate and when the manure is plowed under the crops are very much stimulated and are of better quality.

Carbon Dioxide Gas

There are other reasons why manures are so important. The carbon dioxide gas that is produced in the decomposition of organic matter does much to liberate the essential plant foods. For every pound of potassium, nitrogen and phosphorous that is liberated by this carbon dioxide, twenty pounds of calcium is also made available for plant use. In the growth of crops on a given area it has been found that for every 336 pounds of nitrogen, 450 pounds of potash and 132 pounds of phosphorous that are used in the growth of the crop, 10,800 pounds of carbon dioxide are also being utilized. This carbon dioxide is just as essential for the fertility of the soil as are the mineral elements. The carbon dioxide comes from the decomposition of manures.

Specific soil molds are very active during the first stage of organic matter decomposition. These molds are very effective in producing soil granulation. There are specific kinds of molds that develop at certain stages of organic matter decay that are very effective in increasing water infiltration in the soil. This in turn, prevents soil erosion. When the problem of soil erosion has been mastered it will be found that these soil molds, associated with manures, have done much to make this possible. Chemicals are released from the soil while undergoing decomposition. In every ten tons of manure there is an average of one hundred pounds of nitrogen, fifty pounds of phosphorous and one hundred-twenty pounds of potash present. This is the equivalent of 1150 pounds of the average commercial fertilizer.

It is interesting to note that there is a distinct residual effect from these manures. This effect varies in different parts of the world. Manures have been shown to have beneficial effect for twenty years after they were applied. Bulletins from the Rothamsted Experiment Station in England report improved crop growth on soils that at one time received manures for twenty years and then no manure application for a period of 100 years. Yet the effect of that twenty-year treatment 100 years previously is very noticeable on the barley grain grown.

Bacterial and Mold Activity

Organic matter is very essential for bacterial and mold activity. So many people fail to realize that the soil is a great mass of living matter. In one acre of soil, six and one-half inches deep, there is present in active form billions of micro-organisms. One twenty-fifth of an ounce of soil carries approximately 15-20 million bacteria, about 700,000 fungi, 300,000 to 400,000 actinomycetes, 150,000 protozoa, thousands of algae, nematodes, insects and other animal life! They are working for the good of man. With-out them no life would be upon the earth. They are organized as effectively as any human social organization. The different groups play their part and create an ideal state for seed germination, and growth. They decompose organic matter; they dissolve plant foods, liberating the acids which aid in this process; they take the nitrogen from the atmosphere and change it so the plant can use it.

This soil population is so complex and its activities so numerous that it is a tremendous challenge to man's limited knowledge. Men are apt to look upon the soil as a piece of dead, inert matter but when one studies it one becomes impressed. The shapes of the micro-organisms, their numbers, their activity, their complexity fill one with awe. Everyone should realize that one cannot "farm" the soil without considering this life in the soil. The micro-organisms utilize and require energy-food themselves. For every forty pounds of nitrogen that have accumulated in the soil during the growing season there are 4,000 pounds of energy-food utilized by the bacteria alone. This means that two tons of manure are required for this one process. Then when one considers the sulphur, the phosphorous and the carbon dioxide that are made available by the work of the bacteria while they depend for their bread and butter energy on manures, one can see quite readily that the manures must be present. There is hardly a fertility idea that is not associated with these microbes. How can one go along with soil problems without considering this life in the soil?

The future of a people is no better than the quality of the soil it occupies. Therefore a proper food supply and a suitable home are dependent on organic matter. Nitrites are essential but ammonia must be oxidized. Air
s necessary for this process as well as proper moisture. There must be a suitable soil mulch. Nitrogen fixation must be considered here too, as also the development of phosphorous availability. The activity of the microorganisms working on the organic matter make these elements usable. Acids transfer the phosphorous, the potash, the sulphur and the iron from an insoluble to a soluble state for plant use. Organic matter and bacterial activity furnish these acids.

Let us, therefore, plan and work in the direction of more organic matter fertility in the way of humus-building rags, green manures, barnyard manures and a livestock system of farming in connection with whatever a farmer’s specialty might be.

**MERTENSIA**

A Colorado wildflower that is contented and a welcome guest in the garden is the Mertensia, that delightful member of the azure Borage tribe, so useful in providing true blue color in the border and rock garden. Mertensias, or Lungworts, tend to flower in early spring, giving a double pleasure by the pink buds and later by the turquoise of the fully opened, tubular flowers. *Mertensia virginica* grows to 18 inches, and is frequently found in gardens. *M. lanceolata* is a smaller plant.

The Mertensias bear an excellent reputation for being easily raised from seeds, and they stand transplanting well. My own plants were moved into the garden from the field, and have grown happily and increased on a sunny east bank.

As the season advances the plants disappear—so that they may be interplanted with later flowering plants. And the place for collecting from the wild should be well marked in early spring.

**FRANCES BINKLEY.**

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**WATERING**

Watering is both a chore and a perennial problem. One rule is, “Do not water when in doubt.” Another is, “When you water, do it thoroughly.” Really soaking the soil is a tedious task. An idea is to take the nozzle off the hose and replace it with a sack of stout cloth. This allows the water to flow easily and harmlessly.

When one area is soaked, move the hose to the next. Above all, do not think that the “commuters’ special” type of watering—a sprinkling after supper—is advisable. It does more harm than good. Get the water down at least five inches. The only way to be sure you have done so is to dig down and see.

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**WILD FLOWER CONSERVATION IN THE FAR WEST**

**P. L. RICKER**

*President, Wild Flower Preservation Society*

In addition to the many national parks of the West which serve as ideal wild flower and general wild life sanctuaries, the West is fortunate in having rugged mountains and extensive mountain meadows, far from the larger centers of population, where native wild flowers are found throughout the season in a riot of color not approached for beauty in other parts of the country.

At the higher elevations, except in the Southwest, the temperatures are generally too cool to make it attractive for summer home sites but in some of the southwestern high mountains more or less extensive summer colonies have been established. These are followed inevitably by the introduction of a considerable variety of foreign weedy plants which gradually crowd out the native flora. In the valleys and lower elevations the civilizing process long ago removed most of the native flora as thousands of acres of land were cleared each year for planting, homes and recreation areas.

Now some groups are planning to spend millions of dollars of the taxpayer’s money in order to dam most of our larger streams as a means of flood control in spite of the fact that areas back of all present dams are gradually being filled with sediment, particularly during flood periods. It is estimated that in fifty to 200 years this sediment will have rendered all present dams worthless and new ones made erosion control areas. Not only do the smaller herbaceous native plants in which we are interested help largely in preventing erosion but they also furnish food and nesting material for birds and small animals, many of which are of decided economic importance.

All conservation-minded individuals and organizations should demand that before more flood control dams are built all stream headwaters and drainage areas should be reforested and erosion control measures started and well developed.
NEW ASSETS IN ASPEN

DON BLOCH, U. S. Forest Service

COMMERCIALLY considered, the aspen hasn’t been of much value in Colorado—until recently. For tourists and too many otherwise responsible citizens, the tree has been significant for little more than color-bearer to herald the arrival of fall. For the conservation-wise, aspen is a watershed tree which quickly clothes burned-over areas and prepares the ground for permanent forest types—especially in the spruce-fir zones. Its annual crop of leaves builds up the soil more rapidly than conifers and makes it permeable; spruces and firs, starting in the shade of aspen, become established, push up through them and eventually shade out and kill their protecting nurses—an example of ingratitude in nature which paradoxically results in good.

Now, however, timber from this species—once locally held as a weed tree and almost wholly unmerchantable—is actually “in the open” and on the market with other woods in Colorado. These industries, all of recent vintage, are competing for this timber—62,670 acres of which, on nine national forests in the state, support an estimated volume of about 550 million board feet.

From stands of aspen on the San Isabel national forest is manufactured excelsior, adding wealth to nearby La Veta, Colorado. Established in the early 1900’s in Denver to supply the Kindel Bedding Company, the plant originally got most of its aspen from the Pike forest. Moved to La Veta in 1938, it was destroyed by fire five years later. The present plant, the Colorado Excelsior and Mill Company, Inc., was built in ’43, with all new machinery installed.

Close to a million board feet of aspen are cut annually to supply this La Veta concern. Each working day four cords of the wood are processed, yielding about as many tons of Standard No. 1 grade excelsior—the equivalent of 100, 80-pound bales.

In general the principal market for the La Veta product is in the western states, including Colorado. A large quantity goes by train and truck to California; some stays right in La Veta. The main buyers are wholesale houses, fruit and vegetable packing houses, casket manufacturers and air-condition manufacturers. The casket-makers prefer “wood wool,” the finest grade of excelsior—also producible at La Veta. The Arkansas Valley vegetable growers use a large amount of excelsior in packing tomatoes and other vegetables. Shipments are made direct to the consumers from the mill, although a number of the buyers of the product even send their trucks to La Veta to insure getting their orders filled.

In July of 1944 the first overtures were made which resulted in the establishment, about two years later, of a plant at Mancos, Colorado which today turns out three billion match sticks in a normal year!

On the San Juan national forest, in cooperation with representative of the Berst-Forster-Dixfield Company of Cloquet, Minnesota, principal manufacturers of veneer safety matches in the United States, timber cruisers of the Forest Service found and surveyed a single stand of 70 million board feet of good quality aspen. Some 55 million of this was on nearby national forest land. Since the Cloquet firm—in order to establish a plant permanently—needed assurance of only a 2-3 million board foot supply annually, they bid in a 5 million foot sale and planned operations almost immediately.

A $300,000 plant was built, housing a layout of machines which even yet are in the semi-secret developmental stage, and put 40 local men and women to work. An initial harvest of aspen logs, sufficient for about three years’ operation, now rears like a mountain behind the Mancos building. From it, during the double 8-hour shift each day, are sliced up about 1,200 board feet. This wood, veneered, chopped, treated to prevent after-glow, dried, shaken to eliminate rejects and cartoned, comes out in the ten million splints a day which are trucked to their Minnesota plant for final clipping and dipping heads on them.

After a year’s operation the original B-F-D company was purchased outright by the Diamond Match Company of Ohio. Sufficient aspen has been cruised in the area to keep the plant going another 10-15 years, according to the management. And,
Watch For Red Spider In Your Evergreens

George M. Fisher

This is the time to expect an infestation of Red Spider Mite in evergreens. Almost all types are attacked. This tiny mite does considerable damage to the evergreens often before it is detected. Ordinarily the mite attacks in June or July and feeds on the juices of the foliage. When numerous enough it kills the foliage and greatly weakens the tree. In very hot weather, without control measures, the trees may easily succumb to the attack.

The first indication of the presence of the mite is dull, sooty or dusty appearing foliage, generally in the tops of the trees. Later stages display a brick-colored foliage, quite dry and dead, and webby deposits throughout the foliage. With a hand lens the small, round, pinkish eggs and darker adults may be seen; all about the size of the diameter of a common pin.

Effective control of this most troublesome pest of evergreens requires care and persistence. It should be started early, before the damage becomes severe. Occasional, forceful spraying with water is helpful in reducing the infestations. This treatment should be repeated at weekly intervals through June, July and August. Do not hose the tops of evergreens when the sun is bright but arrange to give a thorough soaking bath in the evening hours.

If water and good pressure are not available or if there are already thousands of the tiny mites crawling over the plants, dusting sulphur applied with a hand dust gun will be necessary for completely effective control. Dusting sulphur works best in temperatures over 80 degrees. Be sure to use dusting sulphur or fine-mesh wettable sulphur—not flowers of sulphur. The sulphur should not be poured heavily over the plants as too heavy deposits will cause foliage burning in the hot weather required for the applications. It is best to stand a foot or two away from the plants when dusting and with the hand gun create a thick fog of sulphur, allowing the wind to drift the dust through the plant. Take care that all parts of the plant are covered. Dusting every ten days with one or more water sprayings in between will effectively control the mite.

The Weekend Gardener

I noticed a piece in the morning paper warning all home owners to look at their Colorado Junipers and see if there might be aphids on them. It said that ants running up and down the tree usually indicated the presence of aphids. I'll look for them. I don't see anything—whaoa there, I saw some thing kick. Sure enough they are on this twig as thick as they can stick. I'll get my sprayer and give them a shot of nicotine or rotenone. These two old Junipers have been here for about thirty years and have been very beautiful most of that time, but now they are beginning to get thin and ragged and they almost hide all view of the street from the front windows. At the rate that I paid for them originally they must be worth a hundred dollars apiece by now. The Oldtimer tells me that the best thing to do with them is to take them out and put in smaller plants again. (I wonder if he is working for some nursery company.) No, he tells me, this is really good advice; that I have already gotten my money's worth from them, and if they are spoiling the effect of the original planting they should be removed. O.K., bring the axe.

I believe that I will see if I can get a good landscape architect to take a couple of hours to look over my place and tell me the things which I should replace and new plants that I should put in to bring the planting up to par.
To rephrase an old historical observation: Westward the star of ardent gardening makes it way. As the other arts, gardening does follow the star of empire. The legendary horticulture of Egypt, the artificial eden of Babylon, the graces of Greece and the roses of Rome—they flourished and they fell with the rise and fall of military and political might.

In our own era, the gardens of Italy, of France, of all Europe, reached their respective heights as the world poured in wealth because of empire building. We who have enjoyed the gardens of Britain, in particular, know magnificently plantings are accomplished over there. Especially have we marveled at the astonishing devotion displayed. This has been true not only in the green and gracious countryside but even in the wretched slums of the great cities. British gardens all glory to the world.

However, the star of empire is setting over Europe and it is rising over America. The crumbling of nations overseas must mean an ebbing of horticulture there. Just so, the tremendous economic development anticipated for the United States can only mean at least a new opportunity for ardent gardening here. Being Americans, undoubtedly we will grasp the opportunity with characteristic enthusiasm and garden as no nation has ever gardened before. If this be so, then now's the hour for all sincere American ardenters to recognize our national horticultural opportunity. It will be ours, doubtless, before we have as good gardens as Britain has now— and even longer before we have as many good gardeners. This is relatively unimportant. What is vital is that we who garden already should resolve at the beginning of the boom to direct the growth of gardening to the advantage of everyone. This is of great importance, for in a modern civilization good gardening is one of the great factors that produce a stable, sensible and contented people.

What direction should our influence take? From here and now it would seem one basic service will be that of determining we shall not continue with a pallid copy of European horticulture. The blight of aping Europe has too long harmed and hindered various phases of American culture. In literature it was much too long a time before we managed a divorce. Even now we give unmerited value to overseas writers. In art, and even more particularly in music, we still behave as children striving not to be creative but as students hoping to please alien teachers. In gardening we must break away from European ideas.

Here, our opportunity in horticulture is boundless. Indeed, it is so vast that we can never have a single type of American gardening. Of course, such is not to be desired. A Cape Cod cottage gardener in New England would be as much out of place in the Spanish patios of California as the lushness of a Florida garden would be in the austerity of the Dakotas. Each section of this vast continent which is our nation will develop its own type of gardening—and magnificently, too.

However, beneath all this consequent richness of variety there must be unifying principles which will express our national being. This is, indeed, to be expected, for gardening is an exemplification of a nation's life. Our gardens will be "American." Everywhere we should make ample use of our native plant material. We have great gardens, both those of great wealth and those of financial endowments but the great majority of the gardens, millions upon millions of them will be those of plain people—who one of our radio commentators describes as Mr. and Mrs. America.

The essential point here is the difference between our gardening and that abroad. In Europe gardening is largely the work of hired help. In America we do nearly all the work in our own gardens ourselves. In days to come the garden budget will be on the same level as the family expenditures for rent, heat, light, clothing and the rest. Gardens will be an integral part of house-keeping and homemaking. They will be part of the American way of life, for when many millions of us get down on our knees in the soil day after day, when every plant we grow will have individuality sufficient almost to make it a member of the family—then we shall really garden.

Thanks to fortune, we are about to begin a new era in gardening. It is for us, who are gardeners now to make sure that our America measures up to this great opportunity.

W. H. C.

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The usual fall display of color in the Aspen leaves was missing in many parts of the mountains this past fall. Many people have inquired as to the cause. Mr. Arthur L. Nelson, Assistant Regional Forester of the U. S. Forest Service explains in a special bulletin that this difficulty is caused by a fungus disease called Marssonia populi. This disease is probably encouraged by our recent unusually wet springs. It causes brown spots on the leaves and induces them to fall prematurely. It may affect the young twigs, and gives a generally unhealthy appearance to the trees affected. Very little is known about the life history of this disease, but it can be controlled in trees under cultivation by the application of any standard fungicide such as sulphur, Bordeaux or Fermate.

CONSERVATION
Conservation means the wise use and replacement of our Natural Resources, so that we ourselves and future generations may continue to benefit by them.

The PURPOSE of Conservation then, is to preserve the balance of Nature, to prevent soil erosion, to protect existing forests and to plant new ones, to clear the streams so that aquatic life may exist and the water be right for our use, to protect wild life intelligently and sentimentally so that it may perform its proper function. Conservation will increase the production of food, fibre and fuel. It will mean the economic salvation of our country.

THE WEEKEND GARDENER
Mom told me this noon that it looked to her like some of the plants in the perennial border were wilting. I can’t believe that it is possible after the hard rains that we had two weeks ago. Sure enough, the ground does look dry, but I remember that the Oldtimer said that the surface of the soil didn’t count for much; that it was underneath that counted. I’ll get a shovel and investigate. Yes, the ground around that peony on the south side of the house is really dry away down. I’ll get the hose set on that spot at once. The ground around the Daylilies on the north looks just as dry, but I’ll also prospect there and see what the condition is a few inches down. Well, that’s surprising, I found the ground plenty moist around those plants. I believe that they will go for several days without any more watering. I once thought that watering was a job that any fool could do, but I am beginning to believe the Oldtimer when he said that watering was quite a science.

As I rest my back, wipe the sweat from my face and look around my yard I wonder if I could not simplify it a bit. There are a number of beds which do not have any apparent reason. I expect that I made them some years ago when Mom brought all those nice plants home from the nursery and did not have any place to plant them. I am going to work over the whole yard next fall and see if I can not eliminate a lot of unnecessary work. The Oldtimer tells me that it will probably make the whole place look better to make the plantings simpler and more appropriate. I’ll be compelled to cut down the work on this large garden or trade it off for a smaller place. It was fun once but is just plain drudgery now that I do not have the kids around to help.