The Green Thumb
The Green Thumb
A Publication of Denver Botanic Gardens

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1965

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The Cover
Betula pendula, EUROPEAN WHITE BIRCH.
Photograph courtesy of Mrs. William H. Crisp.
A TRIP TO THE ALPINE TUNDRA
MARJORIE L. SHEPHERD

IS THE WEATHER HOT AS YOU READ THIS? WOULD YOU LIKE TO GO TO THE ALPINE TUNDRA? IMPOSSIBLE, YOU SAY? NOT AT ALL! LET US MEET NEXT SATURDAY MORNING AT 8:00 A.M. FOR THE TRIP.

SINCE WE ARE GOING TO A COLDER CLIMATE, YOU WILL NEED WARM CLOTHES INCLUDING RAIN PROTECTION, STOUT SHOES, LUNCH, CAMERA AND BINOCULARS, IF YOU HAVE THEM. THEN, SINCE WE WILL BE IN A LAND OF OPEN SPACE, YOU WILL NEED SUN PROTECTION, ESPECIALLY SUN GLASSES.

DRIVING WEST FROM DENVER ON ROUTE 40, WE WILL TURN OFF NEAR EL RANCHO AND FOLLOW ROUTE 103. GOING ON PAST THE BERGEN PARK AREA, THERE WILL BE FIELDS LOVELY WITH COLOR. NEAR THE ROAD, THERE MAY BE A MASS OF PLANTS MAKING A BRIGHT SPOT OF GREENISH YELLOW. THIS WILL BE ROCKY MOUNTAIN SPURGE (EUPHORBIA ROBUSTA) AND, ALTHOUGH IT IS RATHER WEEDY IN HABIT, IT IS PLEASING TO SEE SO MANY PLANTS TOGETHER. AFTER ENJOYING VISTAS ALONG THE WAY, WE WILL BE OVER SQUAW PASS AND NEARING ECHO LAKE. ON THE BANKS ON EITHER SIDE OF THE ROAD, MAY BE SHOWY PLANTS WITH BLOOMS OF BRIGHT BLUE. THESE ARE ALPINE PENSTEMON (PENSTEMON ALPINUS) AND ESPECIALLY NICE SINCE THEY GROW ON THE BANKS SOON AFTER ROAD CONSTRUCTION.

A STOP AT ECHO LAKE WILL MAKE A BREAK IN THE TRIP AND THERE ARE SOME THINGS WE SHOULD OBSERVE HERE. FIRST OF ALL, WE HAVE COME UP TO AN ALTITUDE OF 10,500 FT FROM THE 5,280 FT AT DENVER. THUS, WE HAVE NOT TRAVELLED WEST BUT ALSO NORTH IN CLIMATE THE EQUIVALENT OF ABOUT 1,650 MILES. SINCE THE TEMPERATURE DROPS IN CLIMBING ABOUT 3 DEGREES FAHRENHEIT PER 1,000 FEET, IT SHOULD BE ABOUT 15 DEGREES COOLER.

SEVERAL GROWING THINGS ARE WORTHY OF A LOOK AS WE STRETCH OUR LEGS. FIRST, WE LOOK BELOW THE WALL OF THE PORTICO OF THE LODGE AND THERE IN A DAMP, PROTECTED SPOT WILL BE A ROW OF MUSK-ROOT (ADOXA MOSCHATELLINA). THIS INCONSPICUOUS LITTLE PLANT IS INTERESTING IN

THAT, ALTHOUGH IT MAY LOOK LIKE A MEMBER OF THE BUTTERCUP OR CARROT FAMILY, IT IS AN ORPHAN AND IS THE ONLY REPRESENTATIVE OF THE ADOXACEAE (ADOXA FAMILY). NEAR THE SAME LOCATION, WE WILL FIND TALL CHIMING BELL (MERTENSIA CILIATA) AND SHRUBBY CINQUEFOIL (POTENTILLA FRUTICOSA). TAKE A GOOD LOOK AT THESE FOR WE WILL WANT TO REMEMBER HOW TALL THEY ARE.

AFTER ENJOYING A LAST LOOK AT ECHO LAKE AND THE MOUNTAIN PEAKS BEYOND, WE WILL START UP THE WINDING ROAD WHICH ENDS ON TOP OF MT. EVANS. LOOK AT THE MILEAGE AND WHEN YOU HAVE GONE 3 MILES THERE WILL BE A PARKING AREA. A U.S. FOREST SERVICE SIGN, INDICATING THAT PICKING FLOWERS OR REMOVING WOOD IS FORBIDDEN, SHOWS THAT WE ARE NOW IN A PRESERVE. IN GAINING ALTITUDE, WE HAVE AGAIN TRAVELLED NORTH ABOUT ANOTHER 300 MILES. WE ARE NOW IN THE HUDSONIAN OR SUB-ALPINE ZONE.

IF THERE IS MORE THAN ONE CAR IN OUR PARTY, WE CAN LEAVE ONE BEHIND AND FINISH THE TRIP IN THE REMAINING TRANSPORTATION. THERE WILL BE TWO MORE MILES OF WINDING ROAD AND AGAIN WE TRAVEL UP AND NORTH ANOTHER 150 MILES. ALONG THE WAY YOU MAY LOOK AT THE LAKE BELOW AND REALIZE HOW MUCH ALTITUDE HAS BEEN GAINED. ON THE ROADSIDES THERE MAY BE CLUMPS OF FIZZY-LOOKING WHITE THISTLES (CIRSIUM HOOKERIANUM) AND VERY DECORATIVE THEY ARE.

AGAIN, A PARKING LOT AND SIGNS; THIS IS THE DESTINATION FOR THE CARS. WE ARE NOW ABOVE TIMBERLINE AND THERE IS ONLY TUNDRA WITH ITS CARPET OF FLOWERS AND THE RUGGED BOULDERS THAT MAKE UP THE TOP OF MT. GOLIATH. THIS IS THE ALPINE ZONE.


A NUMBER OF MEMBERS OF THE BOTANY CLUB MADE A TRIP ON JUNE 21, 1958, WITH MR. WOERNER AS LEADER. THIS WAS PROBABLY THE FIRST ORGANIZED TRIP OVER THE TRAIL. IT HAD BEEN RAINING WHEN WE LEFT DENVER THAT MORNING. WE CAME OUT INTO SUNSHINE NEAR ECHO LAKE AND WERE PRIVILEGED TO LOOK TOWARD THE PLAINS FROM MT. GOLIATH AND

![Map of the area with landmarks]
see the tops of clouds. This trip was followed by another on June 28th with the Colorado Mountain Club. There were 47 persons in the combined group. Among those present were Mrs. Ruth Ashton Nelson, Dr. E. H. Brunquist and Mr. Robert L. Woerner. This time we used the first printed list of plants of the Mt. Goliath area, which has been revised several times by Dr. Brunquist.

During the years since that first trip, many people have worked with enthusiasm on various phases of making this a worthwhile project — publicity, marking plants before trips, guiding tours, collecting and mounting specimens for the Kathryn Kalmbach Herbarium, publishing lists and writing articles, to name a few.

Now that we have thought about the history of the spot and stopped to reminisce, let us come back to the present and find out what we will see here. Since this is a year with seasons a little behind schedule, it is possible that we may be able to see two very special flowers which we do not find many places. First of all, we will look for Wheeler wallflower (Erysimum wheeleri), not a tall variety but with blossoms in shades of rose to almost purple. These can usually be found near the upper parking area. If we go to the left a short distance, the air may be sweet with perfume. This is the clue to a small plant with cream colored flowers having a yellow eye which turns pink with age. It is rock jasmine (Androsace carinata). The plants are so diminutive that you will need to look closely to get a good view of their perfection, especially their rosette of leaves at the base of the plant.

Next before we start down the trail, we will examine some of the plants which huddle close to the ground in mats. We should be able to find: moss campion (Silene acaulis), dwarf clover (Trifolium ranum), Alpine clover (Trifolium dasyphyllum), Alpine sandwort ( Arenaria obtusiloba), nailwort (Paronychia pulvinata), Alpine phlox (Phlox caespitosa). These plants grow among the rocks and have roots far into the ground. They may be several hundreds of years old. This area in which they grow is not usually snow covered and they must withstand extremes of temperature and winds.

We will examine one plant more closely than the others, the moss campion. The needle-like leaves give this mat plant the look of moss and its flowers are rose in color. This plant grows in fellfields (rock fields) throughout the Northern Hemisphere, so in looking at this plant you are indeed looking at something which you would see in Arctic North America, Sweden, or to go south and high, in the Alps of Switzerland. Not far away from where we have looked at the mat plants, we will look for an area where yellow and white seem to be prominent and the plants taller. These will be Alpine avens ( Geum rossii) and American bistort ( Polygonum bistortoides) and are plants of the Alpine meadows. Along with these will be Rydbergia ( Hymenoxys grandiflora), Alp lily ( Lloydia serotina), yellow paintbrush ( Castilleja occidentalis) to point out a few.

Among the grasses and sedges of this type of meadow land, we will be apt to find Alpine forget-me-not ( Eritrichium arctoideum). Flowers of an indescribable blue almost cover the small woolly plant on which they grow and, as if this were not enough, they have a delicate fragrance which is worth kneeling down to sniff.

By this time, we have made a start on the trail which leads down. Let us walk along and just enjoy the beauty around us until we find the turn in the trail to the left which will take us to the top of the ridge. (This trail can be used for a circle trip which will return to the upper parking area). When we are on top, we will look between the boulders for a larger and perfectly arranged rosette of thick leaves with an edging of flowers of pink or white. This is big-rooted spring beauty ( Claytonia megarhiza) and its root may be as much as 6 feet long.

Turning back to return to the main trail, we will take time to peer under the edges of boulders. This is the hiding place for small treasures that need protection. One plant is the delicate nodding saxifrage ( Saxifrage cernua) and we might again see the musk-root which we saw at Echo Lake.
On the lower side of the trail, we will find golden buckwheat (Eriogonum flavum). This is a woody perennial with rather gray foliage and yellow flowers. It is one of the fine individual displays of Mt. Goliath.

The shrubby cinquefoil (Potentilla fruticosa) may not be in bloom yet but we will see how it has adapted to the growing conditions here. Instead of a shrub as we saw it below, it spreads into a flat shape and when in bloom is a glow of gold.

Only a few of the plants have been mentioned but since this was a trip not so much to identify flowers as to look for beauty, we will leave it to you to seek out the names of other plants which may interest you. As we continue on the trail, we can see that we are losing altitude and ahead are the “ghosts” we promised and a fine forest of bristlecone pine (Pinus aristata).

This will be a good place to stop for lunch and the “shutter-bugs” can have their special treat for the day. The trees are worn smooth with wind and weather and have interesting texture and color as well as weird shapes.

After lunch, the trip through the forest is restful after the sunshine of the high area. The living pines are beautiful and it is believed that “the oldest living trees of the world belong to this species.”

Farther on there are also stately Englemann spruce (Picea englemannii). There are flowers here, too, and they like the shade which we are enjoying. We will not dwell on these since we went to the Alpine tundra and this area is not included.

Soon we are near the lower parking space and see a few of the mat plants that are still happy at this lower altitude as a remembrance of what we saw this morning.

There is one more rock garden area which you should see. The hillside on the other side of the switch back may be in bloom. Here the dominant flower is Indian paint brush (Castilleja spp.) not orange as we see it on the plains, nor yellow as we saw it above but a beautiful clear red and almost covering the ground in spots.

Did you enjoy the day? Can you close your eyes and again see the rock gardens? Will you look at Mt. Evans next winter when plumes of snow are blowing up there and think about the plants you saw today?

For Further Information


Alpine Wildflowers of Rocky Mountain National Park (Colored illustrations) Bettie E. Willard & Chester O. Harris, Rocky Mountain Nature Association, Estes Park, Colorado.

SOME USEFUL BOOKS


Meet the Natives, M. Walter Pesman, Denver Museum of Natural History.


ERRATA
The following errors were made in the March-April issue of The Green Thumb: Page 30, “Contents”; Line 1; appeared Walter Poppum, should have been Walter D. Popham; Page 40, author’s name appeared Walter Poppum, should have been Walter D. Popham; Page 59, Column 1, Line 15, appeared Edward D. Leonard, should have been Edward D. Bennett.

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SOME GARDENERS like to try the im-
possible and now and then one dis-
covers that such an adventure proves
the so-called "impossible" to be possi-
ble under certain conditions. In at
least one Colorado Springs garden that
I know of there is a redbud which has
bloomed for several years. Occasion-
ally I hear of rhododendrons which are
surviving Rocky Mountain winters;
dogwood and redbud trees bloom in
Boulder gardens; larches and yews
have been grown successfully in Wyo-
ming and Colorado. Doubtless, other
examples could be cited by readers of
this article. The secret of growing
these tender plants in a climate to
which they are not naturally suited is
to make a micro-climate for them. In
some cases this isn't worth doing, in
other cases it is fun to try. So, I tried
to grow figs. My adventure was only
partially successful but I think that
under a different set of circumstances
it might be more fruitful. An adven-
turous gardener who has a liking for
that luscious fruit ripe off the branch
may be tempted to try.

The fruit fig, varieties of Ficus
carica, is a very interesting plant and
in Colorado it can be grown as a per-
nenial or a tender shrub. It provides
lush foliage and the individual leaves
are of beautiful design. Fruit is born
on the new growth and this is one rea-
son that gardeners in cold climates
have a chance of success with it. The
problem of growing it to fruition is in
being able to provide a long enough
frost free season for the fruit to set
and mature. I never achieved ripe
fruit but I believe this would be possi-
able in Colorado at altitudes below six
thousand feet, if it were planted in an
ideal situation. By "ideal situation" I
mean one well protected from wind and
exposed to full sun, especially in late
summer. An angle facing south be-
tween stone or brick walls is desirable.
This could be a corner of a patio if
it received the full sun all summer and
early fall. The brick or stone of the
walls will absorb heat during the day
and so temper the surrounding air at
night. In this way they give some pro-
tection from the frosts and light freezes
to which our mountain climate is sub-
ject in spring and fall.

I had two fig “bushes” in Colorado
Springs which thrived for five summers;
that was until I moved away. After
frost had killed the leaves but before
a hard freeze I laid down about four
canes of each bush, fastening them to
the ground with heavy wire pins. These
and the crowns were then mounded
over with soil and covered with leaves.
They should have an occasional water-
ing during the winter. In the spring
when danger of hard freezes was past
I uncovered them and watered them
well. Thes cans soon broke into leaf
and new sprouts appeared. By early
summer small figs had set on. By fall
the bushes would be four to five feet
tall. But as the position of the sun be-
came lower after the middle of sum-
mer its heat was cut off by neighbor-
ing trees and buildings and was not
sufficient to ripen the fruit. But even
if the fruit never ripens figs are worth
growing for their beautiful foliage.

A fig is not a single fruit in the bot-
anical sense, but a collection of tiny
individual fruits which grow on the
inside of a fleshy receptacle. This
whole structure becomes the juicy,
edible fig. Some varieties of fig require
pollination by a certain species of wasp
in order that the fruit may develop.
This is true of the black mission fig
grown commercially in California. How-
ever, there are varieties which do not
depend on such pollination. Varieties
of this type are grown in Texas, south-
ern Arkansas and Oklahoma. If one
wished to try them in our area, plants
of the latter type should be obtained.
Two varieties of this type are Brown
Turkey and Everbearing. They can
be obtained from nurseries in the
Ozarks or in northern Texas.
Plants are being made to add several hundreds of different kinds of tropical and sub-tropical plants to our interesting collection of temperate zone plants at Denver Botanic Gardens. These plants will be planted in the new and uniquely designed Boettcher Conservatory upon its completion. Many of the plants are already on hand, many more are on order and will be delivered soon for the initial planting. During the ensuing months this number will be increased to give a good representation of the immeasurably rich tropical and sub-tropical flora of all parts of the world.

During a short visit to the Conservatory it will be impossible to get a complete education in tropical botany but it will afford opportunity for the public to enjoy and to study tropical plants the year around. Explanations by trained personnel and short descriptions by several educational media, of some of the more interesting plants may increase the interest in what can be seen during a tour of the Conservatory.

In reality, a tropical jungle is not very colorful as a whole. All shades of green with their various textures occur in diversified forms, with occasionally a brilliantly colored flower. These are usually so high up in the canopy of the forest that only the birds and monkeys see them. However, occasional displays of vivid color in unusual forms will be encountered, that are not often found in temperate zone floras.

In the Conservatory we will endeavor to bring as much of this color into the replicas of the tropical vegetation as scientific accuracy allows. We will especially feature plants with variegated and colorful leaves such as Crotons, Acalypha spp., Aphanandra spp., Dracaena spp., Dieffenbachia spp., Bromeliads, Abutilon spp., Coleus spp., Sanchezia, Caladium and other aroids.

Only a few genera flower continuously, such as the Abutilon spp., Lantana spp. and the colorful Hibiscus in its many varieties.

The Conservatory will be divided into several irregular islands or planting areas. These will be interspersed by paths or trails leading the viewer among the various replicas of tropical vegetation. Scientific and common names will be attached to the plants along with their family name, so that you may readily associate them with members of the temperate zone plants with which you are acquainted.

Various collections of container-grown plants from our greenhouses will be displayed, while they are flowering, in areas provided for this purpose. Additional plant specimens, oddities and educational exhibits will be displayed from time to time to give the amateur botanists, horticulturists and plant lovers a broader scope of the plant world.

Epiphytes of various kinds will be displayed on host plants. They will be growing under simulated natural conditions, with some, perhaps, growing on artificial trees or other supports that will have been placed in those areas of the Conservatory where the conditions most closely resemble that of their native habitat.

The variety of edible fruits, spectacular flowers, plants that have medicinal or other economic use and the number of plants of special interest that grow in the tropics is great. Many of these tropical and sub-tropical fruits, economic plants and plants of special interest will be displayed in our Conservatory. We at Denver Botanic Gardens are putting forth our efforts that many of these plants may soon be available to the residents of Denver, the surrounding areas and to all who may come our way.

Contrary to common belief, a tropical jungle is not very colorful, but many of the most vividly colored and unusual flower forms are to be found in the flora of the tropical areas. Some of the outstanding families and the genera within them that do most to brighten and add interest to our jungles and conservatories are listed below:

Leguminosae—Acacia, Cassia, Passiflora quadrangularis (Giant Granadile)
Calliandra, Bauhinia, Delonix, Erythrina and Peltophorum.

Economically the Leguminosae or pea family is one of the most important families of flowering plants. This family provides many articles of food, fodder, dyes, gums, resins, oils and in addition to this, members of over 140 genera are grown domestically for ornament.

Bignoniaceae — Jacaranda, Kigelia, Pyrostegia, Spathodea, Stenolobium, Tabebuia, Tecomaria, Bignonia, Doxincinta and Pandorea.

Economically the Bignoniaceae or bignonia family, which includes Campsis and Catalpa in the temperate zone, also includes members used for lumber, fence-post material and many cultivated ornamentals.

Bombacaceae — Bombax, Chorisia and Pachira.

Economically the Bombacaceae or bombax family is important as the source of kapok and balsa wood. Species of a few genera are cultivated for ornament.

Malvaceae — Hibiscus, Abutilon and Malvaviscus.

Economically the Malvaceae or mallow family is of greatest importance for the cotton of commerce. Notable among the 30 genera whose species are grown for ornament are the hollyhocks (Althaea) of the temperate zone.

Apocynaceae — Nerium, Acokanthera, Beaumontia, Mandevilla (Dipladenia), Strophanthus, Thevetia, Ahamanda, Eranthera, Plumeria, Trachospermum, Carissa and Ochrosia.

Economically the Apocynaceae or dogbane family is of importance domestically for its ornamentals. Amsonia and Vinca are genera in this family that are hardy in the north. Many members of the family are poisonous when vegetative parts and fruits are eaten. Carissa (natalplum) produces edible fruits and Strophanthus produces an alkaloid useful medicinally.

Verbenaceae — Lantana, Clerodendrum, Vitex, Holmskioldia, Duranta, Congea, Tectona and Petrea.

Economically the Verbenaceae or verbena family is perhaps most important for teakwood lumber (Tectona grandis) of East India. A number of genera contain important ornamentals; notable among them are Verbena and Callicarpa used much in the temperate regions. Several of the tropical and sub-tropical genera listed above contribute important species that are used as ornamentals.

Rubiaceae — Gardenia, Pentas, Coffea, Bouvardia, Coprosma, Serissa, Cinchona, Ixora, Musaena and Psychotria.

The Rubiaceae or madder family is of economic importance primarily for several tropical crops, notably coffee, quinine and ipecac. In addition to these a number of ornamentals are grown from the genera listed.

Rutaceae — Citrus, Triphasia, Muraya, Fortunella, Severinia and Calodendrum.

The Rutaceae or rue family contains many members of economic importance. Notable among them are the citrus fruits: orange, grapefruit, lemon, lime, tangerine, citron (all from Citrus) and kumquat (Fortunella). Temperate zone ornamentals include the common rue (Ruta), dittany or gas plant (Dictamnus) and the Amur-river cork tree (Phellodendron).

Amaryllidaceae — Crinum, Eucharis, Clivia, Hymenocallis, Haemanthus, Zephyranthes, Agave and Furcraea.

Economically the Amaryllidaceae or amaryllis family contributes a large number of plants that are important to many activities. The agaves are primary sources of fibers and forage, particularly of sisal and henequen. Cuban and Mauritian hemp is made from leaves of the related Furcraea. In Latin American countries extensive acreages of agave are grown as the source of the sugary exudate used as the basis for the distilled gin-like liquors mezcal and tequila. Pulque is a fermented beverage from the same source. Flour is made in Chile from roots of Alstroemeria. The better known ornamentals, grown in the temperate zones, in this family are in the genus Narcissus. Also well known is the Amaryllis, the showy genus from which the family gets its name.

Myrtaceae — Eucalyptus, Eugenia, Fijioa, Psidium, Syzygium, Myrciaria, Pimenta, Callistemon, Melaleuca, Myrtus and Leptospermum.

Economically the Myrtaceae or myrtle family is of considerable importance throughout the world but of limited importance in the United States. It is important for the edible fruit of the guava, jaboticaba and Surinam cherry. Spices such as the clove, allspice, and oil of bay rum are also derived from members of this family. Many of the genera above are cultivated domestically as ornamentals in warmer areas of this country.

Combretaceae — Combretum, Quisqualis, Conocarpus, Terminalia and Buicida.

The Combretaceae or combretum family is of little domestic economic importance. The tropical or Indian almond (Terminalia catappa) is cultivated in warmer parts of the country.

Continued on page 129
A GIFT OF LAND to Denver by Mayor E. Bates (1872-1873) was the beginning of City Park. On the land northeast of the present park greenhouse, Mayor Bates planted cottonwood trees in a treeless place that seemed miles away from the city.

In 1883 City Park was extended by land acquired from the state of Colorado. New sections were added from time to time. The original plan was made by Reinhardt Schuetza. According to his plan, trees were planted in circles which were connected by paths. Many of these trees were contributed by citizens and by school children at Arbor Day celebrations. These trees thus became an intimate part of the life of the people. This, a satisfactory plan in the beginning gave rise to a fixed public opinion which opposed strongly any modification to meet up-to-date landscape plans.

In 1918 the driveway from the Museum of Natural History to the lily pond was landscaped at the expense of the Old Croney Club, an organization of pioneer men and women. Forty-two sycamores called Oriental plane trees were planted along both sides of the driveway. A majority of these trees are gone, killed by disease. After almost a half century, 13 trees remain. American lindens are being planted to replace the dying trees.

A map was made in 1932 of a limited space around the Museum, selected because of the many kinds of trees found there. Twenty-three species were noted, the majority of which could be pointed out from any one location. Along Colorado Boulevard silver poplars and American elms alternated with each other. The silver poplars were growing approximately twice as fast as the American elms. Around the pool west of the Museum were fine hawthorns, two species of birch, a sycamore maple, Ohio buckeyes, a Camperdown elm and Japanese maples. An avenue of horse chestnuts was planted west of the central pool. Of these trees only two remain.

In 1951 an agreement was entered into by the City and County of Denver and the Botanical Gardens Foundation of Denver, Inc. and approximately 100 acres in the eastern end of City Park, surrounding the Denver Museum of Natural History and sloping westward were set aside for botanical purposes.

Reinhardt Schuetza who was definitely engaged by the city about 1894, held the office of landscape architect until his death in 1909. In 1910 S. R. DeBoer was appointed to this position and is professionally responsible for the most important advances in the landscaping of our city.

When Colorado Boulevard was widened for a super highway, a wide strip of land on the eastern side of City Park was taken and the many fine elms were destroyed.

The remaining area has been brought up-to-date and given a more modern...
aspect. In the new design, Mr. DeBoer included a Box Canyon with running water. He provided for the Glenmore Pinetum, evergreens donated by Mr. Robert E. More; a lilac lane, lilacs donated by Mr. Milton Keegan; a Rose-rium, roses donated through the Denver Rose Society; hardy ferns donated by the Helen Fowler Library Council; hemerocallis donated by Mr. LeMoine Bechtold and the Iris garden by the Denver Iris Society. In addition are groups of trees of the Prunus varieties and a crabapple tree collection planned by Mr. DeBoer.

Two historic markers are of interest. In the southeast corner stands a fine boxwood hedge from Stratford on Avon, England, was planted by John L. Russell, April 23, 1916. In the area west of the Museum near the lake a bronze marker reads: This grove of nut trees was planted in honor of the two hundredth Anniversary of the birth of George Washington by Peace Pipe Chapter of the Daughters of the American Revolution, 1732-1932. Three black walnut trees remain to represent the grove.

Economically the Araceae or arum family is of little importance in the United States aside from the many members grown as ornamentals. In Old World tropics and sub-tropics the thickened rootstocks of Calocasia (taro) are a source of starchy food, while those of Alocasia are used similarly to a lesser extent. The large “fruits” of Monstera are eaten in many tropical regions and prized for their delicate flavor. Notable among the several genera cultivated for ornamental purposes is the calla of florists (Zantedeschia). Several of the above genera whose members provide durable foliage plants are used for interior decoration.

Acanthaceae — Juticia, Beloperone, Sanchezia, Pseudanthemum, Fittonia, Jacobinia, Crossandra, Ruellia, Aphelandra, Thunbergia, Acanthus and Dendralanthus.

The Acanthaceae or acanthus family is of little domestic importance. Species of several genera, mostly tropical, are cultivated as ornamentals. Several of the genera have species with showy, variegated foliage.

Malpighiaceae — Banisteria, Malpighia, Stigmaphyllon and Thyrallis.

Members of the Malpighiaceae or malpighia family are of little domestic importance. All of the above named genera are cultivated as ornamentals in warm parts of the country. The Barbados cherry (Malpighia glabra) is also being utilized in the commercial production of vitamin “C” because of the unusually high ascorbic acid content of its fruit.

Euphorbiaceae — Euphorbia, Acalypha, Codiaeum, Jatropha, Manihot, Macaranga, Phyllanthus and Hevea.

The Euphorbiaceae or spurge family is of considerable economic importance from the world viewpoint. Products of the family include rubber (Hevea), tung oil (Aleurites), castor oil (Ricinus) and cassava or tapioca (Manihot). Many members of the family are grown domestically as ornamentals, notably the poinsettia, crown of thorns and croton. Sterculiaceae—Brachychiton, Dombeya, Sterculia, Theobroma and Cola.

Economically the Sterculiaceae or sterculia family is important as a source of cacao or chocolate produced from the fermented seeds (beans) of Dombeya wallichii (Pink Snowballs).
The tropical American tree (*Theobroma cacao*). Species of a few genera are cultivated domestically in warm regions as ornamentals.

**Theaceae — Gordonia, Camellia and Thea.**

Economically the *Theaceae* or tea family is most important for the tea plant of commerce (*Camellia sinensis*). Domestically, many genera contribute significant ornamentals of warm climates, notably *Camellia, Cleyera* and *Eurya.*

**Passifloraceae—Passiflora, Tacsonia and Tetrapathaea.**

Economically members of the *Passifloraceae* or passion flower family are of domestic importance as ornamentals and for the edible fruit of the several species of Granadilla (*Passiflora edulis, P. laurifolia, P. quadrangularis, P. ligularis* and others). More than 20 species of *Passiflora* are cultivated for the ornamental value of the vines and the showy unusual flowers.

**Cactaceae — Pereskia, Rhipsalis, Cereus, Epiphyllum, Zygocactus and Schlumbergera.**

The *Cactaceae* are characterized, in general, by the fleshy habit, the spines or glochids arranged in areoles, the flowers solitary and with an undifferentiated perianth of very numerous segments basally fused to form a hypanthium, the numerous stamens arranged spirally or in clusters and the glochidiate spiny or bristly berry.

Economically the *Cactaceae* or cactus family is of domestic importance as ornamentals and are cultivated extensively in the open or under glass in all parts of the country. About 130 genera and over 1,200 binomials are listed in the trade literature as cultivated in this country. The fruit of the Indian fig or prickly pear (*Opuntia* spp.) is edible and a product common in Mexican markets.

**Punicaceae — Punica.**

The *Punicaceae* or pomegranate family is a unigeneric family of only 2 species. The pomegranate is cultivated in warm parts of this country for its edible fruits and as a decorative ornamental.

**Melastomaceae — Tibouchina.**

The *Melastomaceae* or melastoma family is distinctive and readily identified by the leaf venation and the stamen morphology.

Economically the family is of little domestic importance. A few species are cultivated for ornament. In parts of Brazil, where the species are abundant, the family forms a characteristic component of the vegetation.

**Araliaceae — Brassia, Aralia, Polyscias, Dizygotheca, Tetrapanax and Fatsia.**

Economically the *Araliaceae* or ginseng family is of little domestic importance. Many variants of English ivy (*Hedera helix*) are cultivated as evergreen vines. Species of a number of genera are grown as ornamental shrubs or small trees. The pith of the rice-paper plant (*Tetrapanax papyrifera*) is the source of Chinese rice paper and the plant is grown here in the warmer parts of the country as a novelty. Ginseng roots, used in medicinal preparations, are obtained from *Panax quinquefolius.*

**Proteaceae—Grevillea, Macadamia, Banksia, Leucadendron, Telopea and Stenocarpus.**

Economically the *Proteaceae* or protea family is of little domestic importance. The Queensland nut (*Macadamia*) is popular in Hawaii for its fruit, an edible delicacy and the species is grown to a small extent in southern California.

**Asclepiadaceae — Asclepias, Hoya, Stapelia, Cryptostegia and Stephanotis.**

Economically the *Asclepiadaceae* or milkweed family is important domestically for the “down” of low quality obtained from the seed and for a few genera grown as ornamentals. These include the butterfly weed (*Asclepias tuberosa*), bloodflower (*A. curassavica*) and blue milkweed (*Oxypetalum caeruleum*).

**Boraginaceae — Cordia and Heliotropium.**

**Oleaceae — Jasminum, Olea and Osmanthus.**

The *Oleaceae* or olive family is of considerable economic importance. The olive (*Olea*) a source of food and oil expressed from the fruit is of high value. Ash lumber (*Fraxinus*) is of high value in cabinet work. Most of the other genera contribute important ornamentals, notably the lilac (*Syringa*), privet (*Ligustrum*), jasmine (*Jasminum*), golden bells (*Forsythia*), fringe tree (*Chionanthus*), fragrant olive (*Osmanthus*) and Phillyrea.

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The Boraginaceae or borage family is of slight economic importance. A number of species of about 30 genera are cultivated to a limited extent for ornament. Heliotropium and Cordia are notable tropical genera. Temperate zone genera and those used as garden annuals are Virginia bluebells (Mer- tensia), forget-me-nots (Myosotis), lungwort (Pulmonaria), borage (Borago), alkanet (Anchusa) honeywort (Cerinthe), hound’s tongue (Cynoglossum), comfrey (Symphytum) and vipers bugloss (Echium).

Labiatae — Sálvia, Coleus, Rosmarinus, Mentha and Teucrium.

Economically the Labiatae or mint family is of importance as a source of volatile aromatic essential oils and garden ornamentals. Some of the more important essential oils are sage (Salvia), lavender (Lavandula), rosemary (Rosmarinus), mint (Mentha) and patchouly (Pogostemon). Others serve as important culinary herbs prized for the flavor or aroma imparted to foods. The more important ones are pot marjoram (Origanum), hyssop (Hyssopus), pennyroyal (Hedeoma puligioideis), basil (Ocimum), thyme (Thymus) and savory (Satureja). Hoarhound (Marrubium) is used in medicinal preparations and confections. The principal ornamentals include: salvia (Salvia), bugloss (Ajuga), lion’s-ear (Leonotis), dragonhead (Dracocephalum), false dragonhead (Physostegia), Oswego tea (Monarda), skullcap (Scutellaria) and species of Nepeta, Stachys, Teucrium, Thymus, Coleus, Lavandula and Pyrnanthemum.

Aristolochiaceae—Aristolochia and Asarum.

The Aristolochiaceae or birthwort family is of slight economic importance for its several ornamental species of Dutchman’s pipe, pelican flower or birthwort (Aristolochia) and wild ginger (Asarum).

Gesneriaceae — Columnea, Saintpaulia, Gloxinia (Sinningia), Episcia, Recksteineria, Streptocarpus, Kohleria, Aeschynanthus and Achimenes.

Economically, members of the Gesneriaceae or gesneria family are important primarily as ornamentals grown in the open in warm climates or under glass in the cooler regions. Species of Ramonda and Haberlea are prized as rock garden subjects in temperate regions. The most important ornamentals include: gloxinia (Sinningia), African violet (Saintpaulia), Cape primrose (Streptocarpus) and species of Achimenes, Smithiantha, Kohleria (Isoloma), Aeschynanthus (Trichosporum) and Episcia.

Solanaceae — Solanum, Streptosolen, Cestrum, Datura, Solandra, Brunfelsia and Cyphomandra.

The Solanaceae or nightshade family is a large family of about 85 genera and in excess of 2,200 species, distributed primarily in tropical America and South America. It is a family of considerable economic importance. It is the source of such food plants as the potato and eggplant (Solanum spp.), tomato (Lycopersicon), strawberry tomato (Physalis) and red pepper (Capsicum). Also in this family we find the fumitory, tobacco (Nicotiana spp.), such drug plants as henbane (Hyoscyamus), belladonna and atropine (Atropa) and stramonium (Datura). This family provides ornamentals from many genera including Petunia, Salpiglossis, Schizanthus, Lycium, Solanum, Streptosolen, Cestrum, Datura, Solandra, Browallia, Nierembergia and Brunfelsia.

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Along with gray hair and a fly-rod, my companion and I carry a butterfly net when tramping in the Rockies. But only “nuts” or kids are seen with such nets? Hah! We get the limit of trout early in the day, but we are not through for the day. There is no limit on bugs, neither is a license or extensive equipment required. All insects are fascinating, though magnification is necessary to demonstrate the beauty of many. A $3.00 pocket lens suffices for this. Of more importance, we have “netted” good friends in this way, such as Shorty and Mabel of Ophir.

We were spotted by the latter, thanks to net, through a veritable cloud of Celerio lineata (Fig. 1). Incidental to providing information concerning these beasts, we established a lasting friendship. This moth is common in Denver and is popularly called the “White-Lined-Sphinx”.

These are moths of the family Sphingidae. Common names are: hawk-moth, because they are swift fliers; humming-bird moth, since they hover with rapid wing-motion, and have the size and conformation of a humming-bird while sipping nectar at dusk; sphinx-moth (Figure 2), as the larvae assume a sphinx-like pose when disturbed from feeding on your favorite tomato plants; horn-worms, as there is a spine in the form of a slender horn from the eighth abdominal segment. This variety of common names suggests the confusion that has resulted in the necessity of technical names in the universal language of Latin, hence, Celerio lineata.

Moths generally are nocturnal, so we are most apt to observe them at dusk. With this type of lighting, it is very easy to mistake them for humming-birds. In our garden they appear to prefer phlox. However, the heavy concentration of Celerio mentioned above near Ophir was seen near noon in the brilliance of high altitude sunlight. Perhaps these specimens had not read the learned tomes saying they should be nocturnal? Or, were learned tomes not available here? Probably the human authors spent too much time in the laboratory (or committee meetings)!

Frequently juvenile members of this family are found in home gardens on tomato plants. The best control measure is simply to pick off the larvae (they don’t bite) and dispose of them. Since their coloring and pattern represents camouflage at its best, a sharp eye is required. Presence of chewed leaves serves as a guide-post for where to look closely. I generally leave this chore to my companion, since she seems to derive vicarious pleasure from pitching the offenders into the incinerator.

A consolation prize is available for those who miss some of the larvae in the above-mentioned process. The adults of your tomato-worms are beautifully and wonderfully made creatures of nature.

P. S. Grasshoppers make for good fishing. They are easier to catch with a net.

Figure 1: Sphinx Moth

Figure 2: Larva of the Sphinx Moth
**Are Buckwheats Pancakes?**

Joseph W. Oppe

No, Buckwheats are not pancakes. Yes, the achenes of a member of the Polygonaceae or buckwheat family are milled and the resultant flour used in the preparation of buckwheat pancakes.

The Polygonaceae is comprised of herbs, vines, shrubs and trees. It encompasses some 30 to 40 genera and approximately 800 species which are widely distributed in the temperate and subtropical countries.

**Family Characteristics**

The family is quite diverse but its representatives will generally exhibit one or more of the following characteristics: Leaves mostly alternate (sometimes opposite or whorled), simple and entire. Stipules, when present, form a sheath (ocrea) around the stem. (Figure 1.) Stems jointed and often containing a sour juice. Flowers generally small and numerous, usually perfect but sometimes polygamous or dioecious.

Perianth sometimes petaloid and in a single series or sepaloid and in two series. Perianth two to six-parted or cleft. Stamens mostly four to 12, separate and opposite the perianth parts or inserted at the base of the perianth tube. Pistil one, superior, the ovary one-celled, one-ovuled, styles two to three. Fruit a lenticular or triangular achene. (Figure II.)

**The Family in Colorado**

The buckwheat family is represented in the flora of Colorado by six genera. Two of these, *Fagopyrum* (true buckwheat) and *Rheum* (rhubarb), are represented by cultivated species that escaped from cultivation and became naturalized. The other four genera have approximately 100 species and the bulk of these are in the genera *Polygonum* (knotweed) and *Eriogonum* (umbrella plant). *Oxyria* and *Rumex* are the other two genera that occur in our state.

*Common Genera and Their Characteristics*

*Polygonum* or knotweed is a genus containing about 200 species. Several of these are grown for ornamental purposes but the majority are noted for their “weedy” nature.

The knotweeds are annual and perennial herbs, aquatics or more or less woody climbers. Stems are conspicuously jointed; leaves simple and entire with well developed ocrea; flowers small and numerous with bright perianth in racemes, spikes or heads; perianth mostly five-parted; stamens usually five; style two to three-parted; achene lenticular or triangular, enclosed by the persistent perianth. (Figure III.)

Among the ornamental knotweeds, *Polygonum auberti*, the silver vine fleece-flower, is probably best known here in Denver. An extremely hardy vine, it is easily recognized by the numerous, fragrant, white flowers which occur throughout the summer.

There are also three or four other species of *Polygonum* which are grown in the Denver area. The dwarf Japanese fleece-flower (*P. cuspidatum compactum*), which is used as a ground cover, is probably the best known. Its small, greenish white flowers are borne in axillary clusters and occur in the late summer. The dwarf Japanese fleece-flower is often sold under the incorrect name of *Reynoutria* fleece-flower (*P. reynoutria*). The two can be readily distinguished as the *Reynoutria* fleece-flower is only 4 to 6 inches high and has pinkish red flowers while the dwarf Japanese fleece-flower is 1½ to 2 feet high and has greenish white flowers. Both of these species grow quite rapidly, tend to get out of bounds and once established, they are extremely difficult to eradicate. This should be kept in mind when selecting a planting location for either of these species.

The Japanese fleece-flower or Mexican bamboo (*Polygonum cuspidatum*) is also grown as an ornamental perennial in our area. It is taller than *P. cuspidatum compactum*, often reaching 6 to 8 feet in height and is somewhat less aggressive in its growth habits.

*Polygonum bistortoides* (American bistort) is among the better known native species of the buckwheat family. It occurs frequently in the mountains at elevations of 7,500 to 12,500 feet and is a conspicuous member of the alpine flora. It is easily recognized by its solitary, spike-like inflorescence of light rose to white flowers.

*Fagopyrum* or buckwheat contains about a half dozen species. Natives of Europe and Asia, the buckwheats are annual or perennial soft-stemmed herbs. They are closely allied to the knotweeds but may be distinguished from this genus by the fact that their achenes project well beyond the per-
The leaves of *Fagopyrum* are alternate, deltoid or hastate and angle-lobed. The small white flowers are borne in racemes or dense corymbs and have eight stamens and three stigmas. The fruit is a three-pointed achene. The name *Fagopyrum* was derived from the Greek and means "beech wheat" alluding to the likeness of its fruit to a beechnut. (Figure IV.)

The common buckwheat, *Fagopyrum esculentum*, is the best known representative of this genus. A native of central or northern Asia, *F. esculentum* is grown as a crop in cool, moist climates and is well adapted in areas with short growing seasons. It is commercially important in the northeastern United States, northwestern France and eastern Europe.

In the United States, most buckwheat seed is used for stock feed. Buckwheat flour is used in our country to make pancakes but in Russia and Poland, it is a basic dietary item.

*Rheum* or rhubarb is made up of some 25 species which are native to Asia. The rhubarbs are stout perennial herbs having clumps of large, radical leaves with long and prominent ocreas. The flowers are small, numerous, green or white and borne in panicled fascicles or racemes. Perianth six-parted, stamens mostly nine, styles three, achene becoming strongly winged at maturity.

*Rheum rhaponticum*, the garden rhubarb, is the best known representative of the genus even though some other species are grown for ornamental purposes. Garden rhubarb has been known for years and was reported as being used in China as a medicinal in 2,700 B.C. The petioles of the garden rhubarb are the portions which are used in preparing pie fillings and preserves. The lamina or blade of the leaf is said to contain a mildly poisonous substance.

Eriogonum is a genus of about 150 species of annual and perennial herbs or shrubs. They are recognized by their entire, exstipulate, alternate, opposite or whorled leaves; four to eight-lobed involucre, with several to many flowers; flowers perfect; calyx petaloid, six-parted; stamens nine; styles three; achene triangular.

Eriogonum is represented by approximately 55 species in the Colorado flora. *Eriogonum umbellatum*, the sulphur-flower, is probably the best known of all these native representatives. Its bright yellow perianth makes it a conspicuous element of the native flora. It occurs on dry, rocky areas, from the foothills to the subalpine zone.

*Rumex*, the docks or sorrels, are perennial herbs, which are widely distributed in the temperate zone. There are 125 or more species of *Rumex* and 15 of these are represented in the Colorado flora. Most of the docks are "weedy" in nature although a few are utilized as greens for preparing salads.

The docks can be recognized by their hastate, entire leaves; bisexual or unisexual, green flowers; deeply six-parted perianth. (Figure V.)
BUCKWHEATS AND HORTICULTURE

The buckwheat family, as was previously mentioned, encompasses several plants that are horticulturally or agriculturally significant for either ornamental or food purposes. Included within the family are also many plants important because of their “weedy” nature.

Many of the species of Polygonum may be classed as “weeds”. Chief among them are P. convolvulus, the black bindweed, which is sometimes mistaken for the morning glory and P. aviculare, the common knotweed, which is a bad “weed” in cultivated ground over most of the United States. Walter Muenscher in his book Weeds, lists 19 species of knotweeds which may be considered as “weeds”.

The docks or Rumex also contain a number of aggressive, unwanted species. Rumex crispus, the curly dock, is probably the most common and occurs as a “weed” in gardens and cultivated ground.

BIBLIOGRAPHY


GLOSSARY

Achene — A small, dry, indehiscent, one-seeded fruit.
Alternate — Leaves located singly at a node.
Bisexual — A flower that has both stamens and pistils.
Calyx — The outer whorl of the flower which is made up of sepals.
Corymb — A rounded or flat-topped inflorescence with pedicels being attached along the axis, the lower pedicels being longer.
Deltoid — A broadly triangular leaf with straight base and sides curved toward the apex.
Dioecious — A species that has unisexual flowers which are produced on separate plants.
Entire — The leaf margin unbroken or without teeth.
Exstipulate — Leaves not having stipules.
Fascicle — A cluster or bundle.
Hastate — A leaf shaped like an arrowhead but with divergent lobes at the base.
Head — A dense inflorescence of sessile flowers borne on a broadened base.
Involucre — A whorl of bracts subtending an inflorescence.
Lenticular — Lens-shaped.
Node — A point on the stem where leaves or branches are attached.
Ocrea — A stipular sheath surrounding the stem.
Opposite — Leaves located one on either side of a node.
Ovary — The enlarged lower portion of the pistil which contains the ovules.
Panicle — An elongate inflorescence with compound branching.
Perfect — A flower having both stamens and pistils.
Pernianth — The calyx and corolla collectively.
Petaloid — Resembling a petal in color, usually not green.
Pistil — The female reproductive organ of the flower.
Polygamous — A species that produces some perfect and some unisexual flowers on the same plant.
Raceme — A long inflorescence, with a simple pedicel, which blooms from top to bottom.
Sepaloid — Resembling a sepal in color, usually green.
Simple — The blade of the leaf in one piece.
Spike — A long inflorescence with sessile flowers.
Stamens — The male (pollen-producing) reproductive organ of the flower.
Stigma — The enlarged terminal portion of the pistil to which the pollen adheres.
Style — The stalk-like part of the pistil which connects the stigma and ovary.
Superior — The ovary is attached above the point of attachment of the other flower parts.
Unisexual — A flower that has either stamens or pistils, not both.
Whorled — Three or more leaves located at a node.

Figure 3. Polygonum floral diagram.
Figure 4. Fagopyrum floral diagram.
Figure 5. Rumex, floral diagram of pistillate flower.
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