The 1969 PRAIRIE GARDEN

Western Canada's Only Horticultural Annual

PUBLISHED BY WINNIPEG HORTICULTURAL SOCIETY

$1.35

THE PRAIRIE GARDEN . . . 1969

The Prairie Garden

WESTERN CANADA'S ONLY HORTICULTURAL ANNUAL

Published by

WINNIPEG HORTICULTURAL SOCIETY

(Established 1931)

Affiliated with the Canadian Rose Society

A non-profit publication dedicated to the advancement of Horticulture in our Northern Great Plains area.

Winnipeg, Manitoba — 26th Annual Edition — February, 1969

The Prairie Garden, Instant Library for Prairie Gardeners

The Prairie Garden, 1969

This is the 26th edition of the Prairie Garden. Sales of close to 1,200 copies in 1968 plus thousands — yes thousands of orders for back copies is evidence to us that we are filling a need for practical and interesting gardening information tailored to the rigorous and exacting demands of our Northern Great Plains area.

We are deeply indebted to the many western horticulturists — both professional and amateur, who, as part of their service to western horticulture, supply us with the topical information which makes this book the valuable contribution it is to western gardeners.

We believe the words of M. V. Chesnut, Western Canadian garden columnist and broadcaster, best describe what The Prairie Garden Annuals can do for you (The Winnipeg Tribune, December 11th, 1968):

I am often asked to recommend a garden book which would provide some guidance under the unique conditions prevailing across the Canadian Prairies. To the best of my knowledge, there are no hard-cover books written specifically for our climate and soil conditions.

But while we have no hard-cover textbook, we have something just as good, if not better. This is "The Prairie Garden," the annual yearbook of the Winnipeg Horticultural Society. It is more of a once-a-year garden magazine than a manual, but every word in it was written for and by prairie gardeners, about OUR kind of plants and OUR weather conditions, OUR pests and OUR soil problems.

Back copies for 1964, 1965, 1966, 1967 and 1968 are available at 80c each, hence an investment of $4.00 would provide five books, all different, all carefully indexed, to form the nucleus, along with your 1969 edition, of an excellent garden library.

The books are available from The Prairie Garden, 237 Kimberley Ave., Winnipeg 15, Manitoba. *(Postal or money order or cheque plus exchange, please.)*

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Cover Picture—'Comanche'—All American Rose Selection 1969—Courtesy All American Roses Inc. This is a bold new grandiflora rose with large, high centred blooms of brilliant scarlet. Buds open to fully double, 4-inch flowers of 50 petals. Blooms come on long strong stems on a tall well branched plant with excellent foliage.

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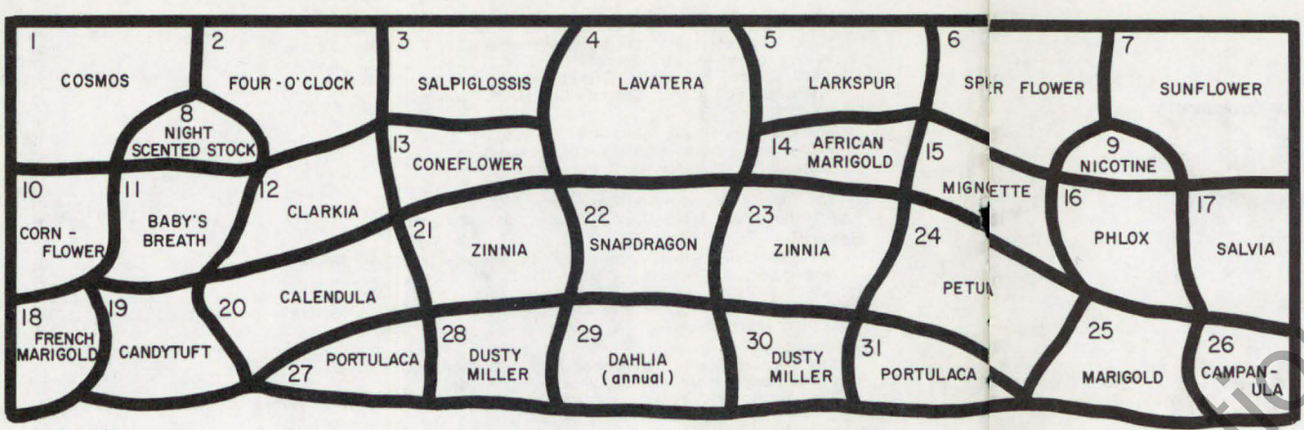


1/2" = 1'

FLOWER BORDERS

F. C. W. RICE

Planning is the first essential in achieving a pleasing effect in either the perennial or annual border. In an effort to assist the home gardener in producing a plan to fit his particular situation, the plans on the following pages are offered as guides. Personal tastes will dictate types of material to be used, but keep in mind that greater satisfaction will result if time is taken to properly plan your borders.

ANNUAL BORDER

As with the perennial border, the arrangement is designed to achieve the same undulating effect with the distribution of color and period of bloom. For fragrance we have included Night Scented Stock, Mignonette and Nicotine. Much of the material suggested may be seeded right where it is to grow. A suggestion is to lay out your border, then place a small stake centering each kind of flower, and if you seed directly in the ground, spread the seed thinly so as not to require too much thinning when the seedlings emerge.

PERENNIAL BORDER

Basically the idea is to have a succession of blooms throughout the growing season. A more pleasing effect can be achieved if plants are grouped rather than planted in straight lines. The groupings in the samples given are so arranged that an undulating effect is achieved, as well as a distribution of the colors and blooming period throughout the whole border.

The plan is also arranged so that one or more of the "tiers" may be selected and adapted to borders of varying depths. The sample plan is for a border 14 feet by 9 feet. The "tiers" are just under 2 feet so one could take, say, the front two "tiers" or the front half of the plan or the back half of the plan, and still have a satisfactory border.

The plants suggested have for the most part been selected as they are available from Nurserymen or Garden Centres.

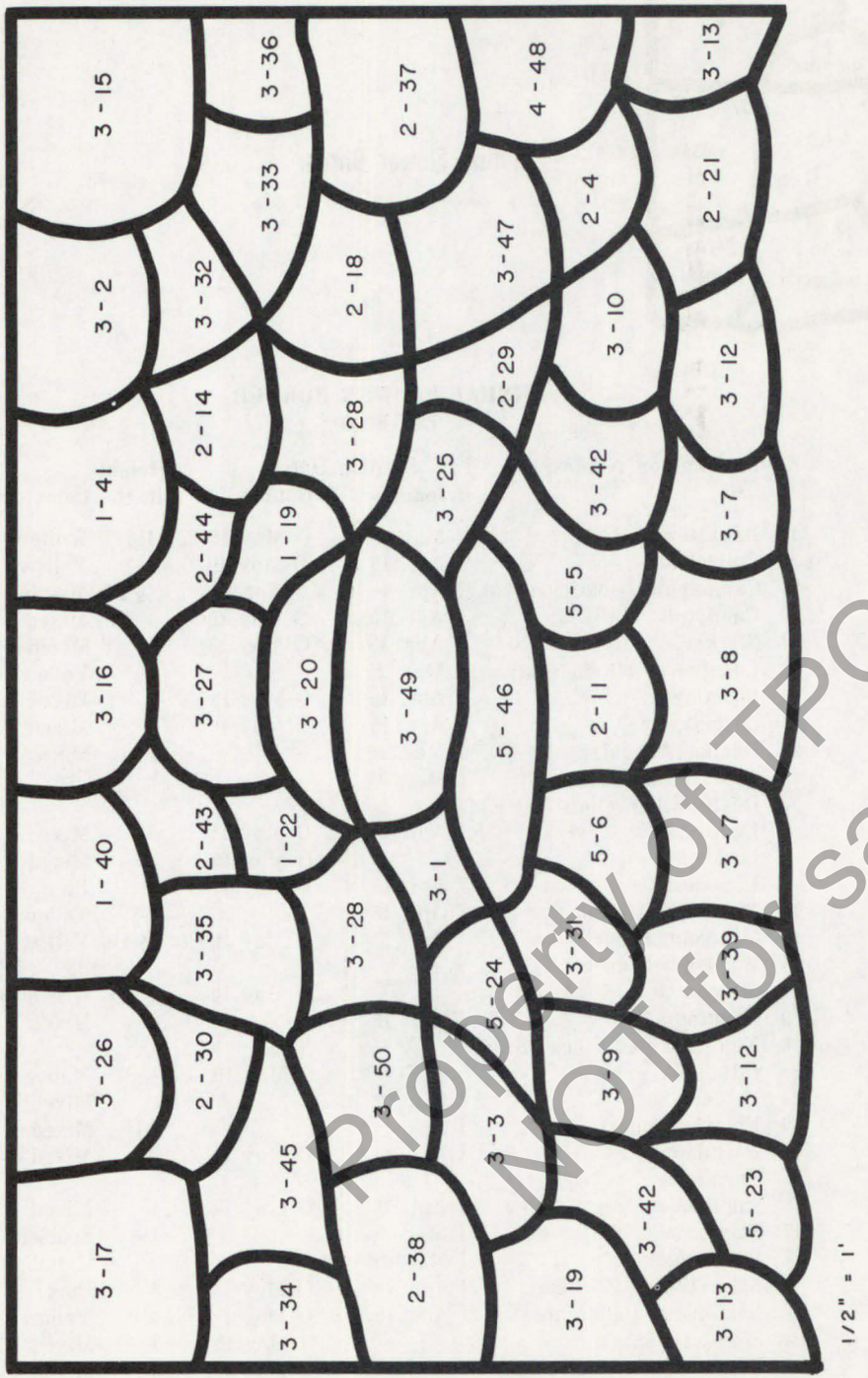
For lists of additional plants and other information, write to your own Department of Agriculture and ask for your own choice of pamphlets, as listed under "Information, Please," in this publication.

Annual Flower Border

ANNUAL FLOWER BORDER LEGEND

Key	Common Names	Seeding Dates I Indoors	Seeding Dates O Outdoors	Height in ft.	Color
11	Babysbreath	I May 1	O May 15	1½	White
20	Calendula	I Apr. 15	O May 10	1½	Yellow
26	Campanula (Bell-flower)	I Apr. 1	O Apr. 1	½-2	Mauve
19	Candytuft	I Apr. 15	O May 10	1	Mixed
12	Clarkia	I Apr. 15	O May 10	2	Mixed
13	Coneflower (Rudbeckia)	I Mar. 25		3	Yellow
10	Cornflower	I Apr. 15	O May 15	2	Mixed
1	Cosmos	I Apr. 15	O May 10	3	Mixed
29	Dahlia (Annual)	I Mar. 15		2-3	Mixed
28	Dusty Miller (*Cineraria*)	I Mar. 25		1	Grey
30	Dusty Miller (*Centaurea*)	,,			
2	Four-o'clock	I Apr. 15	O May 1	3	Mixed
5	Larkspur		O May 15	3	Mixed
4	Lavatera	I Apr. 15	O May 1	3	Pink
14	Marigold, African	I Apr. 15		2-3	Yellow
18	Marigold, French	I Apr. 15	O May 10	½-1½	Yellow
25	Marigold, French	,,			
15	Mignonette		O May 10	1	Greenish
9	Nicotine	I Apr. 15		2	Mixed
8	Night Scented Stock (Mathiola)		O May 10	½-¾	Mauve
24	Petunia	I Mar. 15		1	Mixed
16	Phlox (Annual)	I Apr. 1		1-1½	Mixed
27	Portulaca	I Apr. 1	O May 10	½	Mixed
31	Portulaca	,,			
3	Salpiglosis	I Apr. 10	O May 10	3	Mixed
17	Salvia	I Mar. 1		1½	Scarlet
22	Snapdragon	I Mar. 10			Mixed
6	Spiderflower (Cleome)	I Apr. 1	O May 1	3	Pink
7	Sunflower (Helianthus)	I Apr. 15	O May 1	4	Yellow
23	Zinnia (Giant)		O May 10	3	Mixed
21	Zinnia (Cactus flowered)		O May 10	3	Mixed

Perennial Flower Border



PERENNIAL FLOWER BORDER LEGEND

Key or Group	Variety	Height	Color	Period of Blooming
1	Aster, Italian (King George)	2'	Violet-blue	Aug.-Sept.
2	Aster, Fall (Morden Crimson)	5'	Crimson	Sept.-Oct.
3	Aster, Fall (Morden Lavender)	1½'	Mauve	Sept.-Oct.
4	Aster, Fall (Prairie eventide)	3'-4'	Blue	Sept.-Oct.
5	Campanula, (Carpatica)	1'	Blue	June-July
6	Campanula, (Peachleaf)	2½'	Blue & white	July-Aug.
7	Carnation, (Shadow Valley)	1'	Red	July-Sept.
8	Chrysanthemum, (Cameo)	2'	White	Aug.-Sept.
9	Chrysanthemum, (Canary)	2'	Yellow	Aug.-Sept.
10	Chrysanthemum, (Candy)	1'-2'	Dark pink	Aug.-Sept.
11	Chrysanthemum, (McDonald)	2'-3'	Yellow	Aug.-Sept.
12	Coralbells, (Heuchera hybrids)	2'	Pink	June-Aug.
13	Daisy, Alpine (Alpine Aster)	1'	Blue	June-July
14	Daylily, (Hemerocalis) (Tawny, Copper Red, Heather Rose, Rose Flava, Lemon Yellow)	3'	Various	July-Aug.
15	Delphinium, (Pacific Hybrid)	6'	White	July
16	Delphinium, (Pacific Hybrid)	6'	Pink	July
17	Delphinium, (Pacific Hybrid)	6'	Purple	July
18	Eryngo, (Sea-holly) (Bluetop)	3'	Blue	July
19	Gaillardia, (Burgundy)	2½'	Reddish-brown	June-Sept.
20	Gaillardia, (Goblin, Yellow Tokaj, Wine-red, Yellow Queen, Golden yellow,	2½'	Various	June-Sept.
21	Gypsophila, (Babysbreath) (Rosyveil)	1½'	Pink	June-Aug.
22	Heliopsis, (Scabra)	3'	Yellow	July-Aug.
23	Iceland Poppy, (Kelmscott Strain)	1½'-3'	Various	May-Sept.

24	Iris, Bearded (Darby, purple, Early Blue, Blue Violet, pale Blue)	3'-4'	Various	June
25	Iris, Siberian (Caesar)	3'	Red-purple	June
26	Lavatera, (Kashmir Mallow)	3½'	Pink	July-Aug.
27	Lily, (Brocade)	5'	Orange-yellow	Aug.
28	Lily, (Enchantment)	3'	Orange	July
29	Lily, (Lemon Drop)	3'	Pale yellow	July-Aug.
30	Lily, (Lyla McCann)	3'	Orange	July
31	Lily, (Primrose Lady)	3'	Yellow	July
32	Lily, (Royal Gold)	3'	Yellow	July
33	Lychnis, (*Lychnis viscaria splendens*)	1½'	Red	July
34	Lythrum, (Morden Gleam)	3'	Pink	July-Sept.
35	Lythrum, (Morden Pink)	3'	Pink	July-Sept.
36	Lythrum, (Morden Rose)	3'	Rosy-red	July-Sept.
37	Monarda, (Croftway pink)	1½'	Pink	July
38	Monarda, (Souris)	2'	Pink	July
39	Nepeta, (Dropmore Hybrid)	1'-1½'	Blue	July
40	Peony, (Mary Brand)	2'-2½'	Red	July
41	Peony, Japanese (Mikado: King of England: Tamate-Boku: Tokyo)	2'	Red	July
42	Physostegia, (Alba)	2'	White	Aug.-Sept.
43	Phlox, (Ada Blackjack)	2½'-3'	Rose-pink	July-Sept.
44	Phlox (Elizabeth Campbell)	2½'-3'	Pink	July-Aug.
45	Phlox, (White Pyramid)	3'	White	July-Aug.
46	Pyrethrum,	1½'-2'	Various	June-July
47	Salvia, (*S. azurea*: *S. pratensis*)	2'-3'	Violet	June-July
48	Scabious, (Caucasian)	3'	Blue & white	July-Aug.
49	Shastadaisy, (Esther Read)	2'	White	July-Sept.
50	Statice or Sea-lavender, (*Limonium latifolia*)	2½'	Mauve	July-Aug.

Prairie Anemone
Pulsatilla patens

Cultivation of Native Alpine Plants

STANLEY A. J. POCOCK

Many gardeners who visit the mountainous regions of western Canada are amazed at the profusion of attractive wild flowers that carpet the mountain slopes of the area. They would like to grow some of these bright flowers in their own gardens but think these plants would be difficult or impossible to cultivate. Others dig up plants at random, bring them home in a hot, dry car, and are then surprised when they do not grow.

In fact, most of the Canadian alpine plants grow quite easily in the garden and there are few that cannot be cultivated if suitable growing quarters are supplied. Contrary to general belief for instance, the attractive Indian Paintbrushes will grow in the garden and the Lousewarts (Elephant's Head) can be cultivated and flowered under suitable conditions. The best conditions for growing alpine plants in the garden are, obviously, those most close to their natural habitat.

The first, and main requirement is good to excellent drainage; and the second, ample water during the growing season. These are both essential. Beyond this, most alpine plants are surprisingly tolerant, although they will grow best with soil conditions and exposure as close as possible to that of nature. The normal prairie climate suits alpine plants very well. A relatively short growing season with ample moisture, followed by a long dry period with cold temperatures, is the climate of their natural haunts and also that of much of the prairies.

The type of garden that most closely imitates the habitat of alpine plants is the properly constructed rock garden. The site for such a garden should be open and away from trees. It should receive sun for about half of the day. An east or west facing slope is ideal. A slope of southerly aspect should be avoided since only the most hardy plants will survive long hours of direct exposure to baking sunlight. No rock garden should be built in a straight line but should possess embankments and promontories of different sizes to add variety to the design and provide different degrees of exposure for the plants. North facing, shaded slopes can be formed in this manner, and these are valuable for growing shade-loving plants such as some of the native orchids, Twin flower (*Linneana borealis*) and Bunchberry (*Cornus canadensis*).

If water, in the form of artificial waterfalls and a pond can be incorporated in the garden, it adds greatly to the attractiveness of the construction and also may be made serve as a means of watering adjacent areas. The main requirement of a rock garden is perfect drainage. It is desirable to excavate the entire site and provide a foundation of six to nine inches of coarse gravel or similar rubble. Over the lowest part of the area the gravel may be replaced by a layer composed of one part peat moss and one part sharp sand, and this reserved for a bog or swamp garden. The gravel is covered by a layer of organic material such as inverted turfs to prevent overlying soil washing down and blocking the drainage.

Blue Eyed Grass
Sisyrinchium augustifolium

All of these photographs are of flowers blooming in my own garden and are therefore of wild flowers that can with a little care be cultivated in a rock garden. I would draw particular attention to the Red Paint Brush and the Elephant Head. The latter was photographed in flower in its second year of cultivation and the Paint Brush in its fourth year of cultivation. Many authors state that these plants will not transplant from the wild but it is just not true. In fact I suspect that the Paint Brush could almost become a weed under some circumstances.

To grow the greatest variety of plants, the garden should be divided into three areas. The first should carry a soil compounded of three parts fibrous loam, peat moss one part, coarse sand two parts, coarse gravel two parts. To each cubic yard of the mixture add a handful of lime.

The second area should be filled with the same mixture to which has been added three times the volume of coarse gravel or rock chips. The third area, which should include the most shaded part of the garden, should carry a soil composed of peat moss one part, coarse sand one part and gravel with no limestone one part. The soil should be at least one foot thick over the entire area, and preferably eighteen inches deep.

Up to this point in the discussion of rock garden construction there has been no mention of rocks and, indeed, a perfectly satisfactory rock garden may be constructed without using a single rock. The function of rocks in a garden is frequently misunderstood. Rocks may, and should provide an interesting and appropriate background for the plants, and they may hold up a slope but these are not their main functions. There are all too many gardens with rocks and too few rock gardens.

Rocks chosen for a rock garden may be of almost any composition, moderately soft limestone or slow weathering sandstones being the best. Rock placement is an art that can only be learned by the study of natural rock formations, and by experience. The aim should be to produce a harmonious setting for the plants and the structure should appear solid and permanent. All rocks should be at least half buried with their largest faces resting on the soil. The top surfaces should dip into the slope in order to drain water into the soil. Properly placed rocks prevent too rapid evaporation of moisture, assist in attaining a cool root run for plants, provide a firm anchor for many tufted plants, and provide shelter from excessive wind and sunlight. In the author's experience, a garden of the type described will grow almost all alpine plants.

Watering of alpine plants presents little difficulty once the growth cycle is understood. The main growing period for most of these plants begins in late May or early June, when the winter snows melting from the high ground supply an abundance of moisture; reaches a peak in July; and then shows a decline in August and early September. Ample water should be provided during the growing season, and this should be restricted towards the end of August, although the soil should not be allowed to become completely dry until after the fall flowering species have bloomed and set seed. As soon as regular frosts begin, watering should be discontinued and the ground allowed to remain dry until the following spring.

Once a suitable site for growing alpine plants is decided on, we are ready to look for suiable plants. Surprisingly, one of the easiest places to begin our search for native alpine plants is not in the mountains at all but on the western Prairies, particularly on the banks of valleys, where well-drained gritty soils are exposed. These areas are higher than the highest mountains of the British Isles, and are the habitat of many beautiful dwarfed plants considered as alpines. The bluebell (*Campanula*), Blue Eyed Grass (*Sisyrinchium*), Pasture Sage Brush (*Artemisia frigida*), Dog Violet (*Viola adunca*), . Shooting Star (*Dodacetheon*) and Prairie Crocus (*Pulsatilla patens*) are all very beautiful, are easy to obtain, and grow even better in cultivation than in the wild. Gardeners in the cities of the prairies can actually perform a valuable service in searching sites of building developments and road allowances for desirable plants, since this will help prevent the extermination of some of the rarer species in these areas.

Red Paint Brush
Castilleja miniata

Elephant Head
Pedicularis groenlandica

Yellow Lady Slipper
Cypripedium calcedus var. pubescens

Round-leaved or Fly Spotted Orchid
Orchis rotundifolia

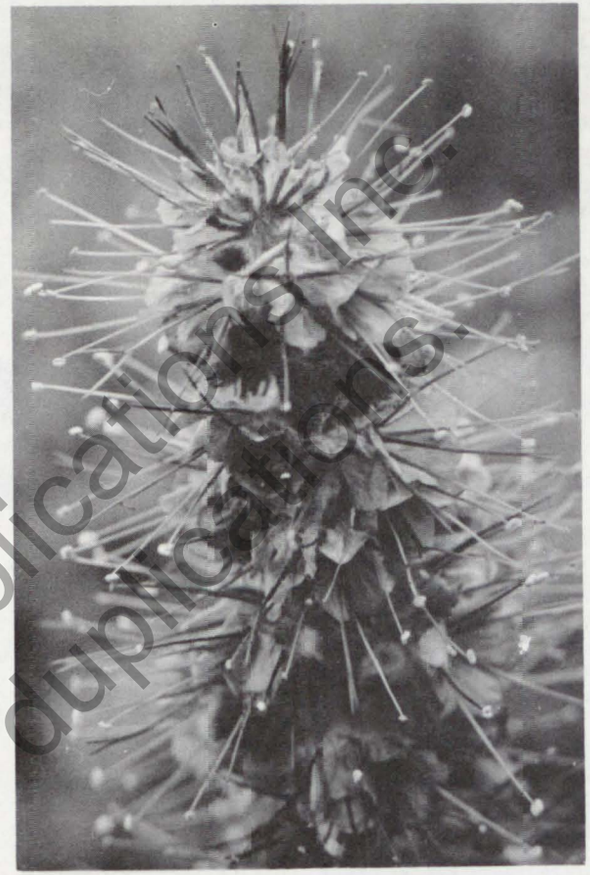
In collecting from mountain regions, one should first determine if collecting is permitted. It is forbidden in National Parks, many Provincial Parks and reserves. Even in areas where collecting is permitted, never remove a plant that appears to be at all rare or uncommon in the vicinity. By removing a rare plant you are contributing to its extinction. Never remove a plant, however common, unless you are reasonably certain that it will transplant successfully. When it is decided to collect a particular species, select a small plant rather than a large clump; it will probably have a smaller root system and transplant more easily. In the case of such plants as the ground Juniper (*Juniperus horizontalis*), Mountain Avens (*Dryas octopetala*) and the Bunchberry (*Cornus canadensis*), where the clusters of leaves arise from a widely ramifying root system, search must be made for seedlings which will transplant easily. Leave larger plants alone. They will not transplant. Normally, however, a small, sturdy plant of the species required will be discovered by careful searching.

Dig the plant up carefully with a strong trowel, being careful to remove the entire root system place in a plastic bag and seal the top. This will prevent loss of moisture during transport, and is preferable to the old practice of wrapping plants in damp moss which frequently kept them too wet and caused rotting. Label the bag, and note the type of soil in which the plant was growing, its humidity and the degree of exposure of the site to sunlight. The plastic bags carrying plants should be placed either in a cooler chest or in a light tight box with cold packs. Plants in transit should never be exposed to direct sunlight. On prolonged trips the bags may be transferred to a refrigerator overnight, provided they are not placed in the freezing compartment. Treated in this manner, plants will keep fresh for several weeks and this method should be followed even on short trips. Plants placed in the trunk of a hot car with no protection, can wither and die in less than half an hour. Once collected plants have been brought home, they should be dealt with as soon as possible.

Remove them from the plastic bags, place in water and wash every trace of earth from their roots; it may harbour pests and, in any case, will not mix with the prepared soil of the rock garden. Select a site in the rock garden with soil as close as possible to that from which the plant was obtained and with similar exposure to the sun. Dig a hole large enough to take the plant roots when spread out, insert the plant, carefully replace three quarters of the soil and fill the hole with water to wash soil round the roots and ensure that there are no air spaces round them. Add the remainder of the soil and tamp down firmly. Tall plants may be cut back, and low, tufted species covered with plastic or glass jars to retard transpiration while the roots become established. Spraying with one of the recently introduced plastic anti-transpirants is also very good, particularly in south-western Alberta where high winds are prevalent. Treated in this manner, the majority of alpine plants may be transplanted fairly easily.

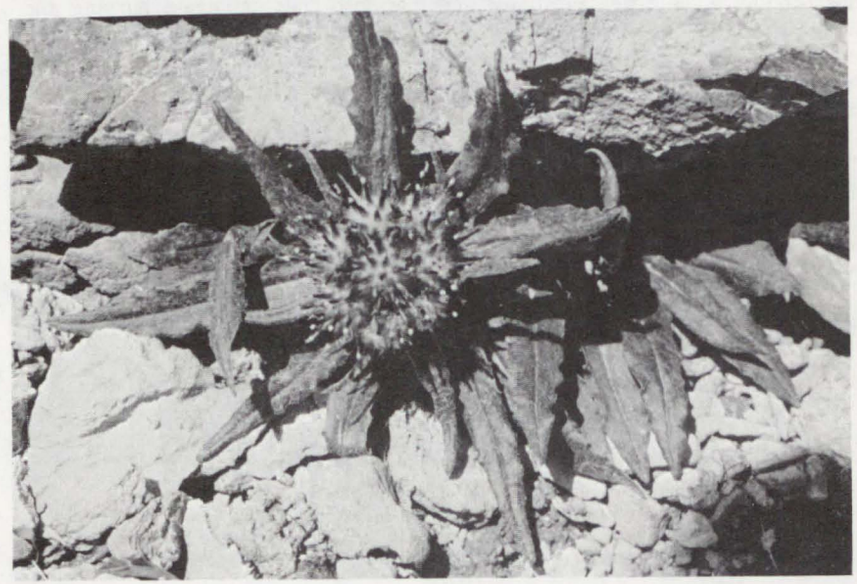
Some plants, for example the Indian Paintbrush and Lousewarts, always wither and look very dead after transplanting and remain like this for the remainder of the season. They should not be discarded, however, since they will normally sprout next spring and flower later in the season. The author has never collected a Paintbrush that failed to transplant, despite the reputation these plants have for difficulty.

One final note — always collect in moderation. The plant lovers' first aim should be to protect and conserve species. It has taken nature over six hundred million years to produce our alpine flora. Thoughtlessness and greed on the part of mankind could destroy it in a few decades.



Scorpion Weed
Phacelia sericea

Sawwort
Saussurea densa



VEGETABLES YOU OUGHT TO GROW

CHARLES WALKOF

Growing vegetables in the home garden can be a series of interesting experiences in plant culture and producing food which will broaden the scope of the family diet. It is possible to have a lot of fun in just growing the conventional kinds of vegetables such as radishes, carrots, beets and lettuce. There is justifiable cause for delight in growing sweet and highly-colored carrots or large, round, smooth, deep red tomatoes. This can be a much less costly way of enjoying spare time than many amusements available today.

In addition to the standard-type vegetables, and to the way these are normally used, there are those which are seldom used and which will contribute much to a means of varying the diet. The cherry-type tomato is a vegetable which, despite its marble-sized fruit, is excellent as a tasty and decorative component of salads. The variety to grow for this purpose in the prairie provinces is the early-ripening, small, bush-type **Farthest North.** It is a delightful tomato and produces large quantities of fruit. There is also the small-fruited, **Sugar** tomato whose plants grow tall and although the fruit matures later, it does well when grown on lattice supports over the warm side of a shed.

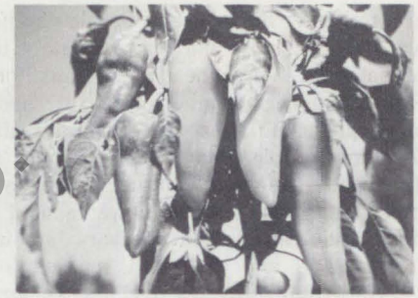
Small potatoes, those that are often left after the large tubers are picked up, are very useful and when served with cream sauce after they are boiled, make an appetizing dish. Try canning them for a reserve supply to prepare a quick meal. To grow small potatoes specifically, up to 1 and 1½ inches in diameter, plant the variety Norland, closely, preferably 6 incches between plants. Water the plants thoroughly in July, especially when dry weather persists.

Cucumbers have a substance which is concentrated just under the skin which causes a bitter taste. It is also responsible for indigestion and the burping often associated with cucumbers when eaten raw, and is the reason many people do not eat raw cucumbers. A new variety, called **Burpless,** does not have the bitter substance and therefore does not cause burping and indigestion. Try this variety and note its excellent flavor. The fruits are unusual in appearance and may grow up to 2 feet long and often tend to bend or curl. The fruits have a small diameter and also a small seed cavity. They are good when used raw or when pickled.

The small-fruited tomato variety, Farthest North, is adapted for growing in prairie gardens and is excellent for use in salads.

The cucumber variety, Burpless, produces long fruits which may curl but they have the best flavor for people with indigestion problems.

Eggplant can be grown in the prairie garden and it adds an interesting item to the family diet.



The hot pepper variety, Earlihot, adds to the spiciness of foods.

Hot peppers are not well known in the prairie provinces, probably because few varieties have been sufficiently early maturing, and they are, therefore, difficult to grow. The new **Earlihot** can be grown in most regions if the plants are seeded indoors in the last week in March and transplanted outdoors in June. This variety does well in a sheltered garden and if the pods are not fully red ripe by fall, the plants can be pulled and hung in a cool, airy place to ripen. Pods that are red should be pulled off, the stems removed, and then the plants thoroughly dried in a warm place. They are then ground up into a fine, granular substance, as with a Wiley mill. Use the ground-up material to sprinkle over roast beef or pork according to your taste. It will accent the flavor of the food and has been thought to provide resistance to colds.

Garlic is often avoided by gardeners because of its pungent odor. In limited quantity it actually accentuates the flavor of meat preparations and it is well known for its health stimulating quality. Garlic is easy to grow. The bulbs are made up of 5 or 6 sections which are known as cloves. Plant the cloves separately just like onion sets.

The eggplant is an interesting vegetable which came originally from India where it is known as brinjal. It can be grown in the prairie garden if the seed is sown indoors in the last week of March and transplanted outdoors in June. The eggplant is related to the potato, so that potato bugs will feed on its leaves. The fruit of eggplant is approximately as large as a softball and is blue-black in color. The varieties, **Early Midget** and **Black Magic** do well when grown as transplants. A favorite way to prepare eggplant is to peel them, slice a quarter inch thick, and steep the slices in salt water for 3 hours. Then dip the slices in egg batter, roll in crumbs and fry in butter.

An interesting feature of the dwarf cabbage variety, **Pee Wee,** is that after the head is cut from the plant in the garden, new buds will form on the stump of the plant and these develop into 4 or 5 tiny, usable heads by fall. Actually they are about the size of Brussels sprouts and are just as tasty. In order to grow the tiny heads, it is essential to water the ground thoroughly around the stump after the original head is removed. Adding a little fertilizer helps.

There are also two other vegetables related to cabbage which, although seldom grown, will provide nutritious green vegetables for the table. They

are sprouting broccoli and purple cauliflower. The heads of sprouting broccoli are usually small and approximately the size of a tennis ball. They consist of potential flower heads and must be used when the buds are unopened. Harvesting normally begins in July and continues through August. The heads of purple cauliflower are essentially like the usual white cauliflower except for their purple color which changes to dark green when they are boiled. The heads are ready for harvest early in September. The seed of sprouting broccoli and purple cauliflower should be sown indoors in the third week of April and transplanted outdoors late in May. Both vegetables are excellent for freezing and are good sources for vitamin A.

Gardening provides a challenge for the home gardener to produce much of the food the family needs and to grow it in variety. The diversity of kinds of vegetables that can be grown in the prairie provinces increases the potential for growing interesting things, which also are appetite stimulants.

Prime heads of sprouting broccoli, rich in vitamin A when cooked.

Secondary heads from a plant of Pee Wee cabbage harvested in September just like heads of Brussels sprouts.

Purple cauliflower turns a deep green when cooked and is rich in vitamin A.

GOURMET GOODIES FROM YOUR GARDEN

B. B. CHUBEY

In our present day affluent society, specialized or gourmet food items are becoming commonplace. A standard diet of "meat and potatoes" is no longer adequate, and the old saying, "variety is the spice of life" certainly applies to our eating habits. Most vegetables grown in the home garden can be prepared in a number of different ways to make them more interesting and appealing to our taste buds; the basic requirement is an imaginative culinary mind.

From the standpoint of new ideas, studies at the Morden Research Station have resulted in some novel and unique products that can be utilized by the homemaker.

"Pickled Baby Cobs" in pint sealers.

Pickled Baby Cobs

A novel way of "adding spice and variety" to sweet corn is pickling immature cobs, which can be used as a side dish or as an hors d'oeuvre. These should be harvested when the silks are just protruding through the husks of the tiny, unfertilized ear. At this stage the cobs are two to four inches in length and one-half to three-quarters inches in diameter.

Usually, the second and third ears on the main stalk of the corn plant, or the ears on the tillers, do not reach maturity or are incompletely filled. These ears, in the early silk stage, are ideal for pickling. The tiny, immature ears are husked easily by splitting the husk with a sharp knife along the entire length of the cob. By opening the slit with the thumbs and pushing upwards with the index fingers, the "baby" cob rolls out easily with a minimum amount of silks adhering to it.

After husking the cobs are washed, packed in jars and covered with hot brine prepared beforehand. A regular dill pickle brine is satisfactory and can be varied to one's liking. To ensure crisp cobs, a pinch of alum can be added to each jar. Bring the contents to approximately 200° F., and hold at this temperature for about five minutes. The high temperature destroys the enzymes which cause chemical deterioration of quality.

"Stuffed Baby Cabbage". Cabbage on left stuffed with rice and ground beef; cabbage on right stuffed with rice; and centre cabbage shows hollowed out area ready for stuffing.

Stuffed Baby Cabbage

The variety Pee Wee, the smallest member of Dr. Walkof's "Baseball Series", is ideal and offers many possibilities for anyone with cooking imagination. Pee Wee averages one-half pound per head and measures approximately two and one-half to three inches in diameter. It possesses excellent quality characteristics due to its fine-textured leaves, and can be used for freezing, brining, pickling, or sauerkraut.

A novel way of handling Pee Wee is to hollow out the inside of the head and stuff it with rice or ground meat filling, similar to that normally used for cabbage rolls. Wrap each individual stuffed head in tinfoil and bake in a closed vessel for one and one-half hours at 350° F. Each head provides one serving, and is truly a gourmet's delight. For freezing, hollow out the heads, blanch for ten minutes, and freeze in plastic bags. To cook, stuff while still frozen and handle as described.

Brined heads can also be used for stuffing. The heads to be brined should be placed whole into a full strength salt brine and left in until used. Remove from brine solution, hollow out the heads, and soak for forty-eight hours in several changes of water prior to stuffing. Whole heads can also be fermented in sauerkraut and handled similarly to brined heads — except they require a very short soaking time.

"Pickled Baby Cabbage" in quart sealers.

Pickled Baby Cabbage

Pee Wee cabbage is excellent for pickling. Three heads can be pickled in a quart sealer. The heads are pickled whole using ordinary, or any variation of dill pickle brine.

A homemaker can experiment with various vegetables grown in her own garden. There is no end to the potential delectable products that an imaginative mind can dream up. Dream a little! Creativity can be satisfying. Be brave, experiment with your own ideas. Variety in food gratifies our taste buds and enhances our enjoyment of meals.

MATURING EARLY TOMATOES AND CORN IN SOUTHERN ALBERTA

CHARLES & ISABELLE YOUNG

Growing tomatoes and corn can be quite a challenge, especially if you get a cold, wet summer. But no matter what the conditions, we usually have enough corn left to freeze, after eating all we want, and more tomatoes than we can possibly eat.

Tomatoes

When we speak of having ripe tomatoes in the garden before the end of June, many people think we've made a mistake, and mean July, but we do mean JUNE. Two years ago we ate the first ripe tomatoes on June 23rd, and three years ago on June 25th! The large-fruited varieties were picked ripe June 30 to July 4 and we have done this for a number of years.

There are several good varieties of tomatoes worth growing. Of the smaller fruited ones, our favorite is Rocket (50 days), which was developed by Mr. Harvey Allen of Lacombe. It is a recent introduction of excellent flavor. Other small tomatoes are Tiny Tim (45 days) and Patio Hybrids (50 days). Dependable, large-fruited varieties are Gardener (59 days) — Indeterminate or staking; Starfire (56 days), and Bush Beafsteak (62 days), both Determinate or non-staking. These are not the only varieties that can be grown, but are the ones we like and have had the most success with.

Our tomato plants are usually started in the greenhouse about March 1st, in a compost of two parts good loam and one part each of sharp sand and peat moss. The seed is covered with one quarter inch of the compost finely sifted, and germinates at a temperature of 60-70°F. Once the plants are up and have their second pair of leaves, we prick out into flats, or into individual 5 inch pots, putting two plants in each pot. We use a soil mixture of three parts good loam with one part each of peat moss and coarse, sharp sand, with the addition of a little superphosphate. The seedlings are put in deep enough to cover the two bottom leaves with soil. About May 1st, the plants are hardened off gradually by putting them into cooler conditions, and not allowing the temperature to drop below 50°F.

Tomatoes like a deep, fertile, well-drained soil. Well-rotted manure can be incorporated into the soil at digging time in the fall. The soil can be warmed by spreading clear plastic on the ground for a week or 10 days prior to planting out. We normally set our plants in the garden about May 15. Tomatoes need a high phosphorous fertilizer during the early stages of growth and so, when setting the plants out into the garden, we use a starter solution of one tbsp. of 10-52-17 per gallon of water, giving each plant one cupful.

They should be planted somewhat deeper than they were in the pot, covering the bottom two leaves. Do not plant near petunias, tobacco or potatoes because the same virus that causes mosaic may be present in these plants. If the plants are allowed to dry out at any time, bud drop

will result, and subsequent watering can cause fruit already formed to crack. Sometimes the base of the stem becomes black and shrunken, causing the plant to topple over. This is 'foot rot', the result of the stem being bruised or damaged when pricking or planting out. Fertilize once a week with the starter solution, but after two or three weeks, this could be alternated with a complete fertilizer such as 14-14-7.

The plants are then covered with 4 mil plastic held up by galvanized wire hoops, leaving a space at least 18" by 18" under the cover, with the plastic wide enough so that it can be held down with boards or bricks at the two sides. A heating cable may be placed in this shelter if the nights are cold.

During warm, sunny days, partially lift the plastic off for ventilation to keep the temperature down, which otherwise can reach 120°F., causing leaf and bud burn.

It is most important that tomato plants not be hardened off to the extent that they receive a check in growth for in that case the very important first truss of tomatoes may be lost when putting the plants out into the garden; and it will then take some time before they begin to set fruit again. It would be better not to harden too much and give additional protection when setting out. If a fruit-setting hormone is used, keep spray away from the leaves as it will cause them to curl badly.

Indeterminate tomatoes produce a great many shoots from the axils of the leaves. Some of these should be pruned out, otherwise too much fruit will set, and it will be later and smaller in size. Do this early in the day so that wounds can callous over. Do not remove any of the leaves from the plant, as these are required to produce the necessary plant food.

After 3 or 4 trusses have formed, pinch out the tip of the main stem, at the first or second leaf above the last truss formed. When tying plants, see that the string passes under the base of the truss and does not bring pressure above it. Old nylon stockings make ideal ties as they are strong and soft and do not restrict the flow of plant food. Stiff, brittle leaves are caused by the use of too much nitrogen.

As the days shorten, it will be noticed that there are still a lot of flowers on the plant. These cannot possibly produce any sizeable tomatoes before frost so pinch out to hasten the ripening of the ones already on the plant. Using this method in 1967, we obtained over 250 lbs. of tomatoes from 15 plants.

We have grown tomatoes both with, and without a heating cable buried in the ground under the plants. Although the heating cable made little difference to growth or fruit, it is useful if the temperature should drop to 10° above as it did May 25, 1968, when the slight heat from the cable could mean the difference between freezing or surviving to the plants. On this particular night a temperature of 20° was predicted, and the tomatoes were already covered with a layer of 4 mil plastic. Over this, two layers of burlap and another layer of plastic were placed. A minimum-maximum thermometer was put alongside the plants. In the early morning, the temperature outside had dropped to 10° above — 10° lower than predicted — and the the temperature under the cover was 26°. We now know that this amount of protection on a windy night will protect against 16° frost. Possibly if they had been covered up while the sun was still on the plants and a heating cable had been in use, we might have saved the plants. As it was, we lost our first lot of tomatoes in 1968, but learned something from the experience. Another year we intend to have a better insulator than burlap to cover the tomatoes.

Corn

The earliest and best corn is produced on light, sandy soil, and the best growth is made during hot weather. In short season areas, corn should be started indoors. We put about five kernels of corn in a baby food tin — a small peat pot would do as well or better — around April 24, soaking the corn for several hours prior to planting. After the plants are up, the two weakest ones are pulled out. Or the kernels can be put on a damp piece of kleenex in a saucer and covered with a piece of plastic about April 29, left until sprouted and three kernels planted to a tin. We give them lots of sun, and water when necessary. They are planted out in the garden about the 19th of May, knocked out of the tin and firmed well into the soil.

We plant in hills, 15 inches apart, in double rows 24-30" apart for cross fertilization. If not pollinated properly, the cobs will fill out unevenly. Each plant is given a cupful of starter solution as for tomatoes and the same method of covering with plastic is used. The protection is left on the plants until the weather warms up and the night temperature stays consistently above 40°.

The fibrous roots of corn are very close to the surface, so only the shallowest of cultivation should be practised. There is no advantage in pulling off suckers that develop near the base, a common practice at one time thought to increase the size of the cobs. This has been proven incorrect but if you wish to take the suckers off, do so when they are very small.

The varieties we grow are Sunny Vee (60 days) and Golden Beauty (63 days). There are also Spancross (58 days) and Golden Midget, small cobs, and others.

Sweet corn loses its sugar content very rapdily during hot weather. This change is four times as rapid at 55° as it is at 32° and at 75-80° is extremely rapid. Only those who grow their own corn know what a delicious vegetable it can be.

As with tomatoes, the use of a heating cable is not essential. Our heating cable is used with a thermostat with a soil probe and set at 60°. The heating cable normally comes on about 8 to 10 P.M. and stays on intermittently for about 12 hours.

Calgary has possibly one of the severest climates on the prairies for the growth of tomatoes and corn as frosts can be expected until the first week in June, and our night temperatures seldom rise to 50°.

THE HOME HERB GARDEN

D. H. DABBS AND C. A. BLISS

Savory herbs are plants whose leaves, flowers, or others parts, are used for flavoring or seasoning foods. Most of them are true herbs, that is, their stems and leaves die down to the roots each fall. They may be annuals, biennials or perennials. Many of these herbs are easily grown in prairie gardens.

If you are growing herbs for the first time, it is a good idea to start with only a few of the more popular and easily grown ones. Later on you can add others that need more attention or that have very special uses.

Culture

One short row of each of the annuals, and about half a dozen plants of each of the perennials, are enough for most families. The herb garden should be in a protected area in the full sun, preferably near the house. Besides their culinary value, some of the herbs are also fragrant and ornamental.

Most herbs grow satisfactorily on well-drained sandy loam, but some at least will grow better on soils that retain more moisture. Herbs need some fertilizer, particular phosphorus, in our prairie soils, but one must be careful not to overfertilize with nitrogen. If lush, rank growth is obtained there may be a shortage of the characteristic essential oils, and thus a poor development of the desirable flavor and fragrance.

Propagation

Most of the common herbs are easily propagated from seed, cuttings, division or layering. Many of them are normally started from seed sown directly into the garden in the spring. Some that are most difficult to start are grown as transplants, in a manner similar to that used for tomatoes.

For most herbs, stem **cuttings** 3 to 4 inches long can be rooted in the same manner as you would root geranium cuttings.

Such herbs as chives and garlic can be increased by **dividing** the crown into separate bulbs or individual plants.

Layering can be used in the garden and is probably more certain than rooting the severed cuttings.

The summer care is much the same as would be given to any vegetable or flower plants. With some perennials it may be necessary to apply a straw mulch in late fall, as for strawberries.

Harvesting, Drying and Freezing

Most of the characteristic flavor of herbs comes from the volatile oils of their leaves or seeds and the plants must be harvested when these oils are at their best. For leaves, this is usually just before the flower buds open out. Seeds are generally harvested when the color changes from green to brown, before any shelling occurs. Seeds may be dried almost anywhere, but leaves retain their color best when dried in the dark. For this reason, an airy, darkened room, ventilated with forced air if necessary, is an ideal place. Any special techniques that may be required will be given for the particular crop.

When the leaves are dry and crisp, rub them through a sieve to powder them and discard the bits of stem and stem-like tissue.

Pack the powdered, dry leaves or dry seeds in dark glass containers

with tight screw caps, or in air-tight tin cans. Store in a dry place away from direct light.

Most of the herbs may be stored in the deep-freeze in freezer bags or cartons for as long as one year.

Common Garden Herbs

Dill (*Anethum graveolens*)

This aromatic plant is familiar to most gardeners as a hardy annual growing from 18 inches to 4 feet in height. The seeds are best planted in rows about 20 per foot and thinned to every 6 inches after early growth. Germination takes from 10 to 14 days.

The plant is harvested when the fruit is fully developed but not yet brown. Both the upper leaves and the umbrella-like seed stalk are used in pickles. The chopped, fresh young leaves are also used as seasoning for meats, poultry, fish and in sauces.

Chives (*Allium schoenoprasum*)

This plant is another common perennial garden herb found frequently in prairie gardens. It grows in clump-form producing an onion-like stem with an attractive violet flower head. Chives may be grown from seed or by division of bulbs in a similar fashion to onions. The bulbs should not be uprooted in the fall, since new growth arises from them in the spring.

A flower pot of chives on a sunny window sill will provide welcome seasoning during the winter months.

The young leaves have a delicate onion flavor, enhancing salads and providing seasoning for meats and vegetables.

Garlic (*Allium sativum*)

As the botanical name implies Garlic is a close relative of chives. The plants are best propagated from cloves obtained by separating the previous years bulbs. Plant 4 to 6 inches apart in rows 15 inches from each other, each clove about 1 to 2 inches deep. Best results are obtained from well-drained soil. At maturity the bulbs are harvested, dried, and cleaned of the outer loose scale before storage.

Cloves of garlic are obtained by segmenting each bulb and are used to give their unique flavor to meats, vegetables, soups and sauces. For best results use sparingly!

Sage (*Salvia officinalis*)

Sage is a perennial plant of the mint family which grows up to 2 feet in height. Its wooly grey-green leaves add a decorative color to the garden. Propagation of the plant is from seeds or cuttings. Seeds should be planted in a cold frame or window box and transplanted to a light sandy soil when 2 or 3 inches high. Usually 3 or 4 plants in a garden are sufficient for the average family.

Six to 8 inches of top growth may be cut from the plants twice a year before the plant blooms. The tops are usually tied in bundles or spread out to dry as previously mentioned.

The crushed or powdered leaves are used sparingly in dressings or on meat. It is also used as an ingredient in mixed spices.

Parsley (*Petroselinum crispum*)

This is a biennial plant which must be treated as an annual on the prairies. It is best seeded in a cold frame or window box in the early spring and transplanted — as early as possible — into rows with 6 to 8 inch spacing. The bushy green plant grows from 12 to 15 inches high and the sprigs may be harvested at any time during its growth period. Potted plants will grow in a sunny spot indoors throughout the winter.

The leaves are best used when fresh but both leaves and roots retain their flavor upon drying. Roots may be stored as other root crops or they may be sliced and dried.

The fresh leaves are a tasty and decorative herb when served with meats and poultry or in salads. Fresh or dried parsley adds flavor to cooked soups and vegetables.

Thyme (*Thymus vulgaris*)

This low-growing shrub-like plant is a valuable addition to the garden, both as a decorative plant and an aromatic herb. It seldom grows over 6 to 8 inches and is a hardy perennial. It may be propagated by seeds, cuttings or divisions and a few plants in a permanent flower bed or rock garden will furnish enough herbs for flavoring purposes. Seeds should be sown indoors or in a cold frame early in the spring and transplanted when 2 to 3 inches high. New plants are best started every 3 to 4 years to prevent the leaves from becoming too tough. Thyme does best in a well-drained sunny location.

For use as a spice the upper 4 to 5 inches of the young flowering tops are cut and dried as previously described. Best utilized blended with other herbs as a seasoning for meats, vegetables, soups and sauces.

Mint (*Mentha piperita* or *Mentha spicata*)

Of the many species of mint which are available the most frequently cultivated species are peppermint (*Mentha piperita*) and spearmint (*Mentha spicata*). Both species are perennials growing to about 2 feet in height. They are always propagated by ground runners (stolons) but individual plants may be wintered by covering with a 3 inch straw mulch. Both species grow best in a heavy well-watered soil but need little extra care except for weeding. Unless confined, these plants will tend to crowd out other nearby plants.

Because of their rapid growth, the fresh sprigs may be harvested throughout the growing season. As with Thyme, the leaves and flower buds can be dried and stored.

Spearmint is most frequently employed in mint flavored beverages and meat sauces while peppermint is utilized in medicines and confections. The fresh leaves of both species impart a pleasing flavor to meats, vegetables, soups and sauces.

Poppy Seed (*Papaver species*)

While not generally considered an herb, poppy seed is easily grown and is a commonly used condiment in baking. Various species of poppy may be grown for this purpose but the larger varieties are most frequently used. Poppy is an annual plant easily grown from seed in a good loam soil. Planted 4 to 6 inches apart and about 1 inch deep, the plants eventually reach 18 inches to 3 feet in height.

While still slightly green the capsules are picked and allowed to dry. The seeds are easily removed from the ripened capsule.

Poppy seed is frequently employed in the baking of cookies, cakes and pastries.

Coriander (*Coriandrum sativum*)

Coriander is an annual plant cultivated for its fruit (usually called a seed). This plant, related to dill, requires a long growing season of at least 90 days. The seed should be planted early in the spring in rows 3 feet apart and 1 or 2 inches from each other. Cover with soil to a depth of about ½ inch. Thinning is not usually needed but weeding is required occasionally. A good loam soil is preferred but no other special care is needed.

Coriander plants should be harvested when the fruits have turned brown

but before they split. Because maximum flavor develops only after thorough drying, the plants should be dried carefully. When fully dried, the fruits are threshed or winnowed and stored in bags or closed containers.

Coriander 'seed' is used in baking, in salad dressings and in preparing various mixed spices.

Savory (*Satureja hortensis*)

Summer savory, another of the mint family, is an annual plant easily grown in the herb garden. It grows well in most soils and reaches a height of from 12 to 18 inches. It is best grown from seeds planted to a depth of ½ inch and 1 inch apart. It is later thinned to 2 to 3 inches apart. For a single garden from 6 to 8 feet of planting will provide sufficient herb. It requires little cultivation.

Leaves may be used anytime during the growing season but for drying the top, 6 to 8 inches of the early flowering plant is utilized.

Both the fresh and dry leaves impart a desirable flavor to vegetables, soups, dressings and sauces. It is also incorporated into spice mixes.

Sorrel (*Rumex scutatus*)

This member of the Dock family is a tall and spreading plant with large leaves and an extremely sour taste.

It is planted either as seeds or by division. In the spring the seeds are planted in rows 2 feet apart, each plant at 4-inch intervals. The young plants may be thinned to 1 foot when established. A sunny, moist area is required for best growth.

The leaves of sorrel are generally used fresh and very sparingly. They impart a sour taste to soups and salads.

A number of seed companies have special herb sections in their catalogs.

Free Bulletins Available: Publication 1158, "Savory Herbs"; Publication 1374, "Using Savory Herbs". Available from: Information Division, Canada Department of Agriculture, Ottawa, Ontario.

Mulching With Polyethylene

H. T. ALLEN

Polyethylene as a mulching material is a cultural aid for improving early and total yields in a number of those vegetable crops that are usually referred to as heat-loving, particularly in regions with cool, short growing seasons. Typical examples of the beneficial effects of plastic mulches are shown by the results obtained at Lacombe this past season, one that we would describe in general terms as being cool and unsatisfactory for warm season crops.

Mulching resulted in 14 days earlier maturity in Spancross sweet corn and yields of marketable ears 3½ times greater. Differences were not so pronounced with the later varieties Sunny Vee and Gill's Early Golden Market, but a seven day spread in maturity was obtained and yields three and two times greater respectively.

Field-seeded and transplanted mulched plots of Marketer cucumber were both 27 days ahead of the field seeded unmulched check, with yields 8 and 21 times greater respectively.

Although the first mature fruits of Vinedale peppers were harvested on the same date, the yields from the mulched plots were much greater for both an 18 inch and 36 inch width of mulch. This difference due to width of mulch did not hold true for the variety Lincoln Belle.

No mature sized fruits were obtained from unmulched plots of either Farworth or Earligold muskmelons; while the mulched plants produced two and one fruit per plant respectively.

Although similar results could be quoted for other seasons, such is not always the case. In 1967 for example, a season with higher than normal temperatures, check plots in most tests were equal in maturity and yield to those mulched with plastic. Nor do all warm season crops respond equally well in the various cool weather zones. Tomatoes for instance, have not shown the beneficial influence of mulching at Lacombe, whereas favorable results have been reported from other locations.

The foregoing may serve to illustrate that some pronounced benefits may result through the use of polyethylene mulching, but variations may be expected depending upon season, location, variety and growing procedures. Some of the yields reported would not indicate that mulching was worth the effort or extra cost involved, but in these instances they also show that mulching may mean the difference between some crop and no crop at all. A general rule of thumb which could be employed is that where a particular vegetable crop is borderline, plastic mulching may be a cultural practise that could be employed to ensure worthwhile productivity. This principle might also apply to some of the cool weather, long season crops, such as brussels sprouts which are difficult to mature in some areas.

One should not expect plastic mulching to counteract poor growing procedures. In most instances the very earliest varieties should be the ones to grow, but it may be possible to improve the quality of the product produced by choosing somewhat later varieties that possess more desirable characteristics, such as larger ear size in the case of sweet corn. Seeding must be just as carefully done when using mulches as is practised without mulching, and crops that normally are started indoors and transplanted to the field should also be handled this way for best results when using mulches.

Polyethylene mulching influences the plant environment mainly by conserving moisture and raising soil temperatures. Soil moisture is thus more constant about germinating seeds, a principle that is most important in heavy soils where adequate germination is sometimes difficult to obtain due to crusting and cracking. The more constant moisture and higher soil temperatures promote rapid early growth that is reflected later in the season by earlier maturity and thus giving the plants that much longer to produce a full crop.

It has been found that clear polyethylene results in higher soil temperatures than does the black and has proven to be superior. Weed growth is controlled by the black but is often extensive under the clear; however, one hand weeding during the season is usually sufficient to correct this problem.

The 2 mil is a good grade of plastic to handle and although the width of strip may vary according to experience, a rule usually followed, is that for upright growing or small plants such as corn or peppers, an 18 - 24 inch strip is adequate, and for spreading plants such as cucumbers, a 3-4 foot strip should be used. Seeding may be done first with the plastic laid over the row and edges firmly anchored. Care must be taken to ensure that slits are cut over the plants as soon as they emerge to prevent damage due to excessive heat. A better method is to lay the plastic strip first and seed through slits at the desired spacing. For small plots of transplants, ten plants or so, it is probably easiest to plant first and lay the plastic afterwards, cutting slits or holes for the plants before anchoring. All edges of the mulch must be kept well anchored at all times to prevent wind from lifting and tearing the plastic away.

The European Corn Borer In Manitoba

WM. HANEC & JULIAN TSUANG

The borer was first reported in Manitoba in 1948 but did not become a serious pest of corn until 1964. Chemical control against the borer was first used in 1964, and the use of insecticides has increased since then. The highest infestations of the borer occur in the south-central region of Manitoba. The reason for this is the favorable climatic conditions for large acreages of grain corn, as well as sweet corn, demanded by the canning industry.

Although the kinds of insecticides and spraying equipment for use against the borer were known from studies in eastern Canada and the United States, the life history, habits and ecology of the borer in western Canada were not known. Knowledge of the latter characteristics is important in the timing and regime of insecticide application. Studies by the Department of Entomology, University of Manitoba, have shown that, because of their feeding habits, the larvae are in contact with foliage sprays for a very short period of time. If insecticide is sprayed on the plant at other times, it will have no effect on the borer.

The borer overwinters as a mature diapausing larva in corn stalks and trash left on the ground. During the past four years an average of 70% of the larvae survived the winters; survival being higher below the snow than above.

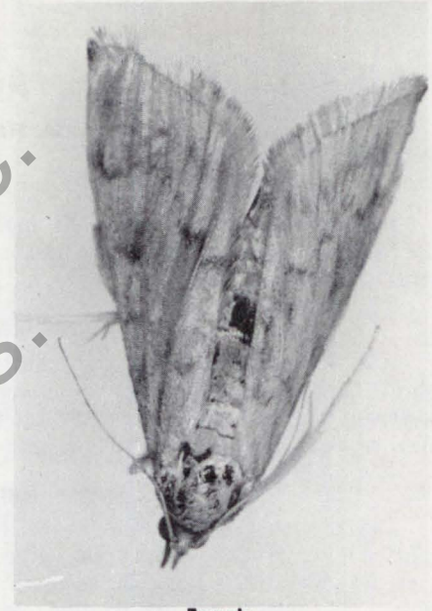
Pupation begins in June and adult emergence, flight and oviposition begin during the first or second week of July. The duration of oviposition varies with weather conditions. It may last only two weeks (1965) or up to five weeks (1967). The highest oviposition occurs on still, humid nights when the temperature does not go below 50°F. The initially white eggs are laid in batches of up to 35 on the underside of corn leaves. The eggs turn black in three to eight days depending on the temperature and the larvae hatch.

The young larvae are photonegative and quickly move to the whorl at the base of the leaf. They feed here or on the developing tassel. Some will then burrow into the stem, others feed on the silk and burrow into the young ear. By the end of August most of the larvae are mature and settled in the ear or in the stem, usually at its base. The mature larvae are about three-quarters of an inch long and may vary in color from white or brown to slightly reddish. They usually have a brown stripe on the middle of the dorsal area and in some, four parallel rows of brown spots run from the posterior to the anterior end of the insect. These larvae do not pupate but enter a physiological hibernation stage (diapause) and remain so until the following spring.

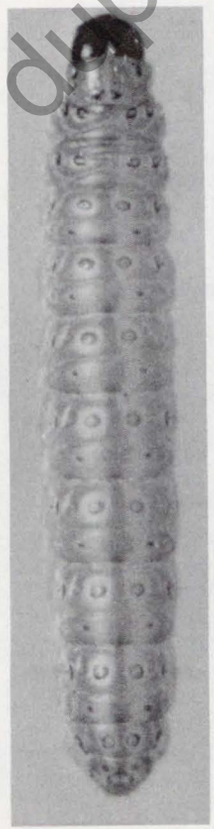
The ear damage to canning and grain corn may be as high as 40%, and even higher in fresh sweet corn. The larvae also damage the stems by tunnelling to cause breakage, or disease organisms may enter the plants through the tunnels causing rot. The most effective insecticides are DDT and Sevin, applied just when the larvae are hatching. At this time they may be directly exposed to insecticides, or will contact insecticide droplets on the foliage. The time of application will vary but it should be during late July or early August. It must be cautioned that DDT cannot be used on corn which will be fed to livestock.

Apart from its economic importance, the borer is unique among insects in that it can survive subzero temperatures by both supercooling and by freezing and surviving in the frozen state for many months. Its ability to supercool is probably dependent on a natural "antifreeze" which has been identified as glycerol. The mechanisms by which it survives in the frozen state are still a mystery.

Male—European Corn Borer



Female



Mature larva

Pupa

Aphids — Fascinating And Destructive Insects

A. M. HARPER

Aphids are among the world's most serious insect pests. They reduce the vigor and yield of plants, contaminate edible parts, transmit destructive virus diseases of plants, and even kill plants if the infestation is heavy.

Kinds of Aphids

It is difficult to say how many different kinds of aphids there are in the world. New species are being described each year. It has been estimated, however, that there are over 2,700 known species. Aphids vary in color and may be red, pink, brown, yellow, green, grey, purple, or black.

Disease Transmission

The English grain aphid is known to transmit only one disease, the pea aphid transmits 27, whereas the green peach aphid is able to transmit over 100 diseases. Among diseases carried by aphids are bean wilt, beet mosaic, cucumber mosaic, pea leaf roll, potato spindle tuber, and virus diseases of the iris and the tulip. Although there are many diseases transmitted by aphids, few cause serious problems on the Canadian prairies.

Reproduction

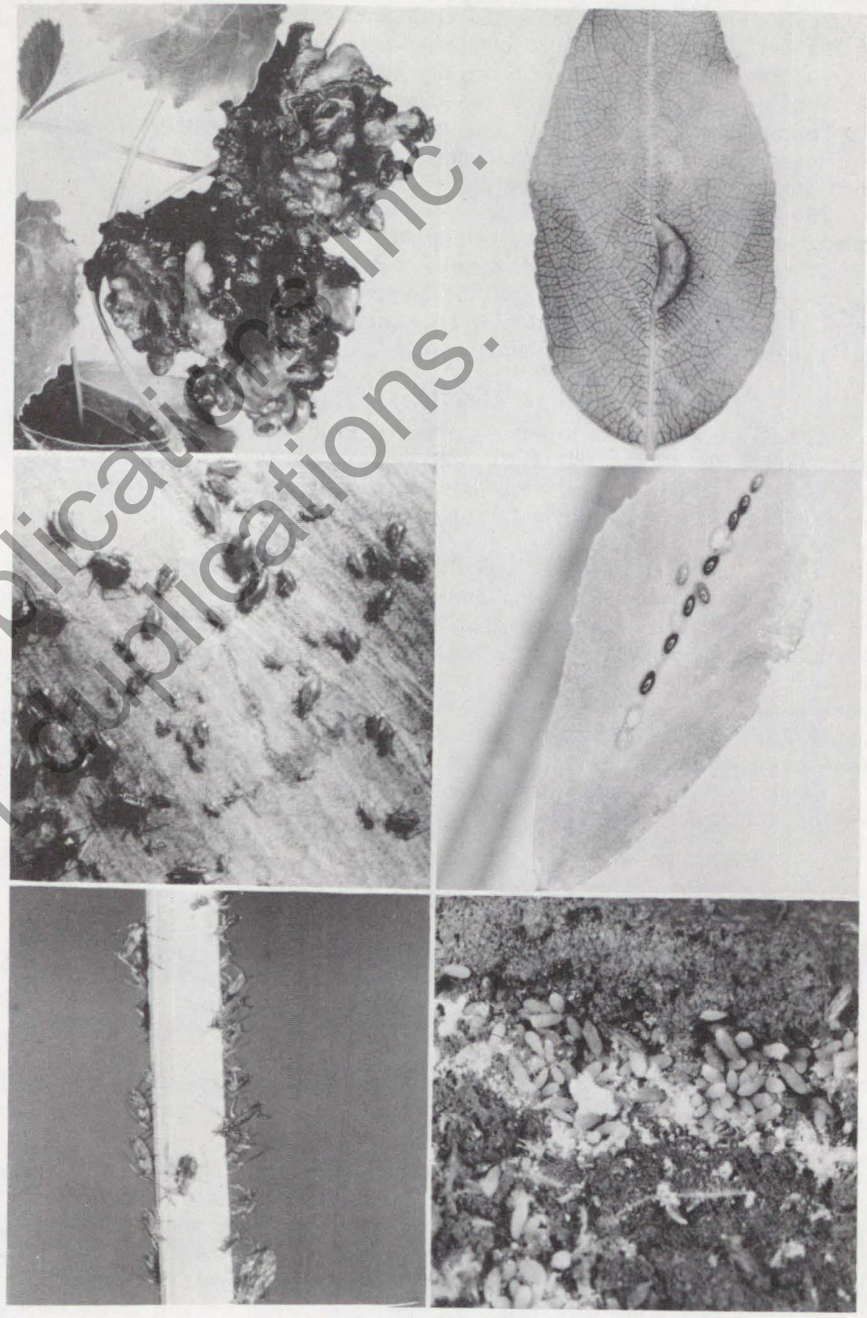
Most aphids lay eggs only once a year. The young that hatch from these eggs produce living female young, which, without mating, can soon produce new female offspring. This type of reproduction is repeated many times during the season. Aphids can thus increase in number rapidly.

One scientist calculated that, under ideal conditions, the weight of the progeny from a single aphid could, by the fall of the year, equal the weight of the human population of China. Obviously, this never happens. Enormous numbers of aphids are destroyed by unfavorable weather, predators, parasites, disease, and other means.

Identification

One of the major problems with aphid research is the accurate determination of species. To show some of the complications of identification let us use the sugar-beet root aphid as an example. This aphid, which we have studied at the Lethbridge Research Station, overwinters either as an egg on poplar trees or as wingless insect in the soil. When the egg hatches a yellow to dusky-green aphid emerges and begins to feed on the poplar leaf. As it feeds it forms a gall around itself. The wingless aphid in the gall has a pair of antennae each of which have four segments. The offspring that she produces are a dull-green to black, with wings and six-segmented antennae. They leave the gall and fly to sugar beets where they produce wingless white to yellowish aphids with five-segmented antennae that live on sugar-beet roots.

The wingless aphids continue to produce wingless forms like themselves on sugar beets until late summer, when they produce dark-colored winged aphids with six-segmented antennae. These fly back to poplars where they produce small wingless yellow males and females whose antennae have four



Upper left: Gall on deltoid poplar caused by the vagabond gall aphid.
Upper right: Gall on balsam poplar caused by the sugar-beet root aphid.
Centre left: Aphids feeding on tulip leaves.
Centre right: Eggs of the pea aphid on alfalfa leaf.
Lower left: Aphids feeding on the stem of golden glow.
Lower right: Sugar-beet root aphids in the soil on secondary roots of sugar beets.

segments. These, in turn, mate and each female lays an egg in a crevice in the bark of the tree, thus completing the cycle.

We thus have four wingless forms and two winged forms of aphid, which all look different but all belong to the same species.

To complicate matters more, the wingless aphid that hatches from the egg looks more like several other species of aphid that cause poplar galls than its own offspring that migrate to sugar beets.

The winged form, in turn, looks more like the migrants of other closely related species of aphid than its own mother or its own offspring.

To solve problems of aphid identification it is often necessary to know a great deal about the biology of the species and, conversely, a thorough knowledge of aphid identification is necessary for the satisfactory solution of biological and control problems.

Control

Aphids are a nuisance to home gardeners. Predators such as lady beetles and syrphid fly larvae frequently will control aphids but where flowers, trees, and vegetables are severely infested we must still rely on the use of insecticides such as malathion for aphid control.

Present in Ancient Times

An aphid was recently found embedded in clear amber in the tailings of an open-pit coal mine near Medicine Hat, Alberta. The bentonite that overlaid the amber-bearing coal has been determined radiometrically to be about 72 million years old. Fossils of five other species of aphids have been found in amber on the shores of Cedar Lake, Manitoba. Fossil aphids have also been found in England and Denmark. Those from Denmark were in amber calculated to be 35-50 million years old.

Obviously aphids have survived for millions of years and probably will survive for many more.

Wireworms In Field And Garden Crops

R. H. BURRAGE

Wireworms are the larvae of elaterid beetles or "click beetles", and make up one of the most destructive groups of field and garden crop pests in the Prairie Provinces. The larva, or wireworm, is the injurious stage and spends all its life in the soil. Wireworms attack almost all crops. They damage and kill plants by burrowing into the planted seed or underground parts of seedling stems, and make potatoes unmarketable by burrowing into the developing tubers. There are over 130 known species of wireworms in the Prairie Provinces, but only a few are important. Of these, the prairie grain wireworm, *Ctenicera destructor* (Brown), is the most widespread and destructive.

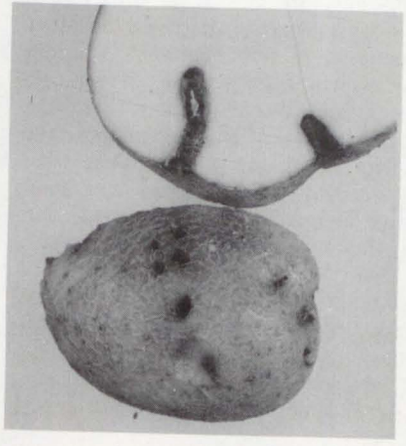
The adults, or "click beetles", of the prairie grain wireworm are black and about ¾ of an inch long. They emerge from the soil in the spring, after having spent the winter in cells in the soil. The females do not move about much initially, but the males are very active on the soil surface on warm, sunny days, running about looking for unmated females.

Prairie grain wireworm "click beetle", full-grown larva, and pupa, about twice natural size.

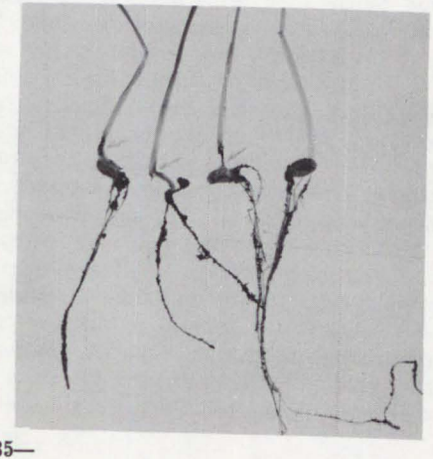
Wireworm eggs and first-instar larvae, about 40 times natural size.

Seeds taken from the soil after being chewed out by wireworms.

Wireworm tunnels in potatoes.



Shredding of seedling stems, near the seed, by wireworms. The right hand plant is undamaged.



The females begin to lay eggs about three weeks after mating; none have ever been observed in flight, and they appear to move about entirely on foot; this is not true for all species. Egg laying lasts about a month in the field, though the majority of eggs are laid during the first two weeks. One female has been known to lay over 1400 eggs; however, the average number appears to be considerably lower. The females are not good diggers, and cracks and crevices in the soil help them get their eggs down where soil moisture and temperature are best for egg survival. The new eggs are less than 1/50 of an inch long and weigh less than 30 millionths of a gram. In the field, they hatch three of four weeks after being laid.

The newly-hatched wireworm larva is about 1/50 of an inch long and weighs less than 50 millionths of a gram. It feeds in the soil and grows very rapidly, and by the first fall it may be over 40 times its original weight. When it is full grown, several seasons later, it may be over an inch long and weigh over 1/10 of a gram — hundreds of times its weight in the beginning. Newly-hatched larvae apparently cannot live more than a few weeks without food, whereas older larvae have been known to survive for more than a year. The prairie grain wireworm, and some other species as well, takes in its food in largely liquid form; it crushes the plant tissues with its mandibles, regurgitates fluid which dissolves some of the solid plant matter, and then swallows the mixture of fluid and dissolved plant material. This process accounts for the shredded appearance of plant parts attacked by wireworms.

The wireworm larva molts, or casts its skin for a new one, perhaps ten or eleven times during the several seasons of its existence. It feeds immediately after a molt, and then ceases feeding for a while before molting again. This behaviour results in two or three peaks of feeding activity during each growing season — one in the spring when the field and garden crops are becoming established, and at least another in the fall when potato tubers are developing. Finally, during a late summer or early fall, the larva changes to the pupal (resting) stage; then, before winter, the pupa changes to an adult which overwinters in a cell in the soil until it emerges the following spring. In most populations there will be some adults emerging and some eggs laid every year; thus, a population will have larvae varying in size from newly-emerged ones to ones which are full-grown and about to pupate.

Wireworms are extremely hard to find in the field, even though most of the time they are in the top six inches of soil; also, many of them look much alike, especially in the larval stage, so that it is difficult to distinguish one species from another. The best way to find out whether or not wireworms are a problem in gardens is to use potatoes as baits. The baits should be placed three or four inches deep in the soil during either late May and early June or late July and early August. If the potatoes, when they are dug up about three weeks after placement, have wireworm tunnels (these may or may not contain wireworms) in them, then damage from wireworms may be expected. Treating the soil with a recommended insecticide is the most effective way of controlling wireworms, and one treatment usually will take care of the problem for several years. Care must be taken to use the correct amount of the insecticide which is recommended for this purpose; carelessness may result in harmful insecticide residues in food plants. Wireworms seldom are eliminated from the soil with any treatment, so that eventually the population will build up to a damaging level again. Watch each year for signs of wireworm damage, and treat the soil again when necessary — and only when necessary.

Aster Yellows

P. H. WESTDAL

Yellow and stunted ornamentals that fail to flower, lettuce with reddish pustules on the new leaves, carrots with pale feathery new growth, and sunflowers with green, leaf-like sectors instead of normal yellow florets, may all be suffering from the same disease — aster yellows. This type of yellowing, dwarfing and malformation of plants is familiar to most gardeners.

Aster yellows is known to attack over 300 species of plants in 48 families. In fact, most of our commonly grown ornamentals, vegetables and cereals are susceptible to the disease. Fortunately, aster yellows is not a problem every year, and in some years the disease is actually difficult to find. However, it is troublesome every three or four years, and serious once in every ten.

The disease organism that causes aster yellows is carried by a small, grey-green, wedge-shaped insect known as the aster leafhopper. The only way the disease can be spread is when infected leafhoppers feed on susceptible plants, but not all aster leafhoppers carry the organism. The severity of the disease thus depends to some extent on the number of disease-carrying insects present in a given area.

The aster leafhopper does not live over winter in the prairies, but is blown in on south winds from the United States each spring. Hot weather in June and early July favors development and dispersal of the leafhopper and the disease. Conversely, cool, wet weather, particularly in June, tends to lessen the amount of disease present. Thus, the severity of the disease depends not only on the number of disease-carrying leafhoppers that are blown into the prairies in the spring but also on weather conditions after they arrive.

Control of aster yellows is very difficult and consists essentially of preventing leafhoppers from feeding on the plants to be protected. This is almost impossible, short of screening the plants. However, considerable success has been obtained with a rigorous program of frequent applications of malathion (2 times per week) at the rate of 1 lb actual per acre or, for small plots, 1 tbsp. 50% malathion per gal. of water. Treatment should begin when plants emerge or are placed outdoors, and continue throughout the growing season. Strict adherence to the spray schedule is very important since any relaxation could result in re-invasion by leafhoppers and infection of the plants. **Note that sprayed parts of vegetables may not be eaten within 14 days of treatment.**

There is evidence to indicate that bedding plants may become infected before they are set out. To avoid infection at this stage, cold frames or frame houses should, where possible, be screened to prevent entry of leafhoppers.

For almost 50 years, scientists believed that aster yellows was caused by a virus. In mosts respects aster yellows behaves like a virus disease, but the actual proof — isolation and purification of the virus and viewing the particles in an electron microscope — was never established. However, a recent Japanese discovery which has excited scientists around the world suggests that leafhopper-transmitted, yellows diseases are caused by a minute form of bacteria called mycoplasma. Mycoplasmic organisms are known to cause diseases in man and other animals, but this is the first time mycoplasma has been implicated in diseases of plants.

One of the interesting and practical implications of this new discovery is in relation to control of the disease. The Japanese scientists found that certain antibiotics destroy the mycoplasmic organisms and "cure" plants. It is thus possible that aster yellows may in future be controlled by spraying plants with antibiotics. In any event these new findings have led to a renewed interest and re-evaluation of aster yellows and its control.

Weed Control For Home Grounds

J. O. FORBES

Every gardener has a weed problem. Usually the weed problem is both varied and expanding. Varied in that it may be chickweed in shaded areas of lawn or flowerbed, portulaca in the garden, quack grass invasion of the yard, or barnyard grass on the driveway. Expanding in that the more hoeing, mowing or cultivating done, the worse the infestations seem to get.

Often the weed problem is introduced by transplanting such things as cypress spurge, toadflax or creeping bellflower into the perennial border only to have them take over the entire area and spread onto the lawn. It can be the top soil or sod used for improvement that is infested with undesirable plant species. It is often cultural control techniques improperly used. Most plants will adjust to such treatment as mowing by growing very short flower stalks to enable seed production to propagate the race. Mother Nature is very adaptable! This is a good feature, except when it applies to undesirable plant species, commonly called weeds.

Let us consider the use of aids for weed control. These will include mechanical as well as chemical programs. They will not replace land preparation for planting; they will not necessarily be a one-shot program; but they will give you an opportunity to learn more about the nature of plants, since this is really the basic problem — competition with nature.

My first suggestion is the use of plastic sheets. Polyethylene of six mil thickness is very durable. Farmers use it to cover grain piles and haystacks, builders use it to enclose structures during inclement weather. Color doesn't matter. Clear is as good, or perhaps even better, than black. You can see what is happening. It works best for flower or vegetable or fruit transplants and the larger vegetable varieties. Have your seed bed well prepared and smooth. Seed, then spread the sheet loosely over the area. Hold the edges down with earth. As seedlings pop through the ground, make a small hole in the plastic and guide them through it. In transplanting, merely reverse the procedure. Carefully puncture the plastic at the desired spot, plant in soil and firm earth around the roots. Watering can be done directly through the hole in the plastic. Rain will disperse the same way.

Advantages of this setup are to suppress weed growth by keeping out the air and direct sunlight. The polyethylene sheet keeps in the moisture given off by the weeds. This condenses on the sheet and falls back for the flourishing vegetable or flower to use. This is a very desirable feature in dry areas without irrigation. The sheet is also an advantage when used with strawberries, it keeps the berries off the ground so that they are clean. The main disadvantage is the damage that can be done by sharp-clawed animals or hob-nail boots. A little care is all that is needed as polyethylene is extremely durable.

My second suggestion is the use of herbicides to control the weed problems. Many people hesitate to use chemicals. They have done harm before, or a neighbour has, and so they are not going to make the same mistake again. Please remember this truth: "There are no safe herbicides for weed control **but** there are herbicides that can be used safely". Also, it is well to remember that herbicides are designed for specific action. They are selective as to the plants on which they will react. It is necessary, therefore, for you to determine the weed problem first in order to select the proper chemical for the job. It may even be necessary to use two or three different products to control all of your weeds.

Identification of the weed problem is a must. If you are not sure, contact the local weed supervisor, agricultural representative; or forward a specimen taped to a stiff piece of cardboard to the Plant Science Department, Faculty of Agriculture, The University of Manitoba; or to the Soils and Crops Branch, Manitoba Department of Agriculture, either at the Agricultural Centre, Brandon, or the Norquay Building, Winnipeg. Be sure and include a clean portion of the root as well as the stem, leaves and flower.

Once the problem has been identified, the location will dictate choice of herbicide to some extent. Broadleaf weeds require the use of hormone type chemicals; 2,4-D, MCPA, 2,4,5-T, Mecoprop and Banvel. The non-volatile formulations should be used for maximum safety. Application should be made using low pressures. Always spray in the morning when the dew is on for best results, and generally when there is little or no wind to blow the spray around during application.

Grass control herbicides vary in their effect, both on the plant and in the soil. The new addition to the control field, Gramoxone, is perhaps the safest to use. It is a desicant, burning off the green top growth. It loses all activity once it contacts soil, therefore, there is no residual worries to other plants, nor is there danger to root systems underneath the area. Re-treatment is necessary as the roots or perennial grasses are not affected. Control is to grow the plant out by repeatedly burning off top growth. TCA, Dalapon and Amitrol T are short term sterilants, very effective when properly used. The main advantage is the effect on the grass roots, which allows quicker total control. However, nothing else grows either until the sterilizing effect disappears. This usually takes from six months to a year, depending on the rate of application.

Long term sterilants (over one year control) are also available. These are good for fence lines, driveways, storage areas, patios, and for fireguard around buildings and gas tanks. Care should be taken in treating sloped areas as the sterilant effect will wash down the slope with rain and spread out at the lower end. Some sterilants are more susceptible to this movement than others. Avoid use of sterilants inside the drip line of trees as their roots may pick up the herbicide.

Here are six rules that it is wise to follow:

1. Apply all herbicides as directed on the label.
2. Use non-volatile chemicals. This mainly applies to "selective" products such as 2,4-D, MCPA, Banvel.

   Know the meaning of these terms:

   Volatile — easily evaporated. This applies generally to "ester" formulations.

   Low volatile — (l.v.) evaporation occurs at high temperatures (85° and higher) ie: low volatile esters.

   Non-volatile — no evaporation at any temperature. This includes amines and sodium salt formulations.

   These terms should be on the label. Read to determine which you want.

CAUTION: Never use an ester. Low volatile products should only be used in early spring or late fall when weather is real cool. Use "amine" formulations and always be **safe!**

3. Use applicators wisely when applying chemicals. **Never spray** when it is **windy.**
   a) Calibrate the machine. This can only be done through trial and error.
      —Select type or types of applicator you plan to use (sprayer, watering can).
      —Use **water only** to determine how much actual square feet of area

you can cover under normal rate of work with each type of equipment. —Using actual area covered in above, refer to product label to calibrate how much product to mix in applicator.

b) Keep droplets large on pressure sprayers by nozzle selection and low pressure.

c) Thoroughly clean out applicator after use. Use lots of water. Be careful where you empty the flushing.

d) Mark applicator "Herbicides Only". **Do not use** to apply insecticides.

4. The best time to apply most selective herbicides is early morning (mainly 2,4-D or MCPA and combinations with them). — when dew is on grass — wind is calm — morning sunshine — when weeds are young and actively growing.
5. Be prepared to repeat application of herbicides on new growth later in the season.
6. **Know** your weed problem — **select** proper chemical for control. Contact the local weed supervisor in your area for identification of weed, and chemical advice.

WEED PROBLEM	CHEMICAL	REMARKS ALWAYS READ LABEL. RATE IS ON THE CAN.
General Broadleaf Dandelion	2,4-D MCPA amine	Apply in early morning for best results. Don't water until at least 2 hours after spraying. When applied on a lawn, do not mow for a few days after application.
Black Medic, White Dutch Clover, Ground Ivy, Chickweed, Plantain	**CMPP (Mecoprop)** Dicamba (Banvel)	Usually in combinations with 2,4-D amine. Best used in early season. See remarks for 2,4-D amine.
Poison Ivy	Amitrol T (Weedazol)	Apply direct to leaves of plant. Avoid contact with any desirable plant species.
Rose Bush, Raspberries, Hawthorn, Poplar	2,4,5-T	Alone or in combination with 2,4-D (Brushkill). Usually low volatile formulation. Careful use in early spring or late fall for safety.
Quack Grass, Barnyard Grass	**Dowpon: TCA, Amitrol T**	Rates required of your choice of the **bold lettered** products mentioned produces 6 to 12 month soil sterility. Excess watering after weed control occurs will help leach chemical from soil.
	Paraquat (see vegetation control section).	Paraquat burns off top growth. Does not affect the soil. Repeat application when re-growth appears.
Wormwood Specie	2,4-D amine	32 ounces per acre in spring. Repeat 2 months later.

WEED PROBLEM	CHEMICAL	REMARKS
Portulaca	2,4-D amine	Rotate garden plot. Encourage weed growth on non-crop area. Apply 2,4-D amine at 16 ounces per acre. Repeat on re-growth. Careful application of 2,4-D along rows and around infested flower and tree areas will give control of weed.
Perennial thistles, Cypress Spurge, Toadflax	2,4-D amine	1. Apply 32 ounces per acre when plants start to bloom. Leave undisturbed for 3 weeks after application. Then cultivate. 2. Apply 16 ounces per acre to new growth repeatedly through the season. Works well in shelterbelts with spray.
General Vegetation Control	Paraquat, (Gramoxone)	Contact herbicide, burns off top growth, chemical inactivated on contact with soil. Good for grass control, particularly under trees and shelterbelts. Avoid contact with leaves. Does not affect bark except on very young trees. Repeat application when necessary on perennial grass re-growth.
	Liquid and dry forms of vegetation killers. Most companies have these in granular or liquid formulation.	Be sure that treated area is free of tree and shrub roots. Chemical will wash downhill with excess moisture. Excellent material for fireguard protection around buildings, fuel depots, parking areas, fence lines. Read directions before using.

Basic Insecticides For The Home Gardener

C. C. BERNIER

Only a few of the more common insecticides of the many that are on the market will suffice for control of practically all of the insect pests in the home garden and grounds. Of just as much importance as the insecticide, however, is its formulation (e.g. granular, emulsion, dust, etc.), the type of application (e.g. spray, dust, paint-on, watering can etc.) the correct rate of application, the correct timing of application (relates to the life history of the insect), and repeated applications when necessary. The following common insecticides are sufficient for most cases, providing that the above mentioned points are borne in mind and good common sense is used.

DDT

A long lasting broad spectrum insecticide for control of a wide variety of insects particularly plant bugs, flea beetles, cankerworms and other leaf-eating caterpillars on vegetables, fruit plants and ornamentals. DDT should not, however, be used on edible portions of vegetables or on fruit.

Malathion

A short lasting broad spectrum insecticide for control of a wide variety of insects and, in particular, aphids, pine needle scale, and leafhoppers on vegetables, fruit plants and ornamentals. It is particularly useful when application must be made close to harvest.

Kelthane

An excellent miticide for control of various species of mites such as spider mites, spruce spider mites, cyclamen mites, eriophyid mites on fruit and ornamental plants. It is particularly useful when application must be made close to harvest.

Chlordane

A long lasting broad spectrum insecticide that can be used for control of turf insects such as white grubs, wireworms, sod webworms, ants and earthworms.

Diazinon

A short lived insecticide that can be used for control of maggots in onions and rutabagas.

Metaldehyde

A short lived material for control of slugs in flower beds and gardens.

With these insecticides you will be able to control practically any insect pest with which you are confronted. Check each product label carefully to be sure of what insects, and where, it is registered for. Then follow exactly the recommendations on the label for a successful insect control program.

Most fungicides presently used to control plant diseases are protective fungicides. They are effective only if present on the plant surface before infection occurs and must be applied as soon as the first signs of the disease are seen, or preferably before if the disease is known to occur every year. To obtain good results, fungicides should be used strictly according to directions on the package, on crops specified, in amounts specified, and at times specified. Other precautions listed, especially safe handling, frequency of application, and interval between last application and harvest, should also be faithfully observed. There are many fungicides on the market, but one or more of the following will control most of the common plant diseases.

Captan

An excellent, safe fungicide to control leaf spots, blights and fruit rots on fruits, ornamentals, vegetables and turf. Also used as a seed protectant for vegetables, flowers and grasses. Does not control powdery mildews and rusts.

Thiram

Seed and bulb treatment for vegetables, flowers and grasses. Controls rusts. Soil drench for crown rot and damping-off. It is also a good rabbit repellent when sprayed or painted on fruit trees for winter protection.

Maneb and Zineb

Both are excellent general fungicides to control foliage and fruit diseases of vegetables, trees, turf and flowers. Maneb is preferred for tomato, potato and vine crops. Controls rusts but not powdery mildews.

Dinocap (Karothane)

This fungicide is specific for control of powdery mildews on all plants. Do not use in hot weather (above 85°F) and apply when foliage will dry rapidly.

Multipurpose Sprays and Dusts

They contain insecticides and fungicides and are generally safe and easy to use. They eliminate the necessity of stocking a large assortment of garden chemicals. Many chemical companies now have mixes designed especially for use on tomatoes, potatoes, vegetables, fruits, roses, etc. Most mixes can be used on a wide variety of plants. When a fungicide is needed, i.e. Captan or Maneb, a multipurpose mix containing the material can be substituted for the chemical alone. When DDT is present in the mix, do not use on food crops within one month of harvest.

SYSTEMICS FOR INSECT CONTROL

DR. H. F. WILKINS

Insect pests of plants normally are controlled by sprays and dusts which are applied to the surfaces of plant foliage. Man has, however, long desired to have a chemical control **within** the plant.

Development of useful insecticides which are absorbed by the plant is relatively new. A certain measure of success has been reached in finding insect-killing materials, called systemics, which are absorbed either by the leaves or roots and become a part of the "sap" of the plant. Thus, when an

insect attacks, the insecticide is already there.

Through the use of systemics the problems of obtaining incomplete coverage or being washed off by rain, encountered in the use of surface insecticides, is avoided. Systemics absorbed by any part of the plant are distributed throughout the plant system.

Systemics are effective for a relatively long period of time, some giving protection against insect damage for as long as six weeks.

How did the idea of systemics come about? Leonardo da Vinci (1452-1519) is reported to have used arsenic injections to control insects on a peach tree. The arsenic made the fruit unfit to eat, but the idea was to have an internal poison to control the pest.

In another early observation it was noted that the South African plant "Gifblaar" produced a natural potent systemic insecticide. This observation encouraged entomologists to "dream on" and to find chemical compounds which would be suitable for insect control. In 1936, it was observed that wheat growing in the western parts of the United States where soils were high in selium, were free of aphids. However, it was not until World War II that a German research worker uncovered the modern-day types of chemical systemics.

Systemics are particularly useful for avoiding injury from piercing-sucking insects, such as aphids, thrips, mites, mealy bugs and scales. In addition, borers and leaf miners are also controlled. Some chewing insects may be killed, but many may escape. Thus, we have a few more miles of research to complete before our dream of a completely effective internal insecticide is realized.

A systemic insecticide must be able to penetrate into the plant through the leaves or roots, and must be translocated into the sap system. Movement of the chemical is usually toward the most rapidly growing aerial portions of the plant.

Foliar absorption is usually greater from the lower side of the leaf than from the upper side. The degree of penetration into leaves is dependent on a number of factors. These factors are temperature, light intensity, and type of leaf surface.

Systemics applied to the foliage are absorbed and translocated faster than those applied to the root area. However, soil applications seem to remain effective longer. Most materials are absorbed freely by the roots and are transported to all parts of the plant. In order to be effective an insecticide applied to the soil must not break down before it can move into the root tissue, and it must not injure the root system. The speed and degree of deterioration is dependent on the plant species, growth rate, evaporation of water from the leaf tissue, soil leaching, and leaching of the material from the leaves by water. The character of the soil has influence on the availability of systemics to the plant. Clay and peat soils strongly absorb the material and may render it unavailable for absorption by plant roots.

Systox and Meta-Systox R are old reliables and are marketed under various brand names. Both have a wide crop range from apples to ornamental shrubs. Dimethoate (Cygon) is widely used on ornamentals. Di-Syston is a good systemic which is long lasting. There are granular formations, which can be applied to the soil. Phosdrin is best used as a foliar spray. This chemical is also registered for use on many vegetables and has a short life.

Systemics are a welcome addition to the chemical shelf of the home gardener. However, they are to be used with great care. Improperly used they can kill you as well as insects. Follow strictly the instructions on the label. **Do not use systemics on food crops unless the label specifically states that such use is approved.** — *Reprint by permission: The Minnesota Horticulturist*

My Experience With Plums

R. L. WODARZ

Back in the twenties, a farmer, N. C. Jensen, had a good sized plum orchard near our town of Wyndmere in North Dakota. It was his custom to invite the neighborhood folks in the fall to either sample, or buy, some of his plums. Sometimes there would be a political speech before any of the loaded plum trees were allotted to the customers. We knew very little then of the new hybrid plums like Waneta or Fiebing. Mr. Jensen's varieties were probably native selected plums. In those years, some of the recommended kinds were DeSoto, Cheney, Wolf, Wyant and Surprise.

The trees were not grown in bush form; the height of the trunks seemed like five feet, might have been supported with a slender post when planted as used to be the case in Europe. The orchard was in sod, and very neat.

Our first hybrid plum trees came from our local nursery. We thought $2.50 was high for one tree but Mr. Strubel explained that the originator was receiving a royalty. We bought two Loring Price plums. The trees grew nicely, but they never bore fruit. Waneta was next of the better hybrid plums we tried and it did very well. Some years it would set too heavy a crop which, of course, cut down on the size of the individual fruit.

Of the many varieties of plums offered by nurseries and experimental stations we had the following on observation: Waneta, Fiebing, LaCrescent, Radisson, Redwing, Redcoat, South Dakota, Superior, Pipestone, Redglow, Gracious, Toka Ember, Winona and Chinook. We discovered later that some of these were infested with borers and some showed resistance. If a hybrid plum persists for 30 years it is probably immune to this pest. Fiebing, LaCrescent, Radisson, Redwing have done that. However easy prey to borers are: Superior, Pipestone, Toka, Ember, and Winona. I selected a hybrid plum tree resistant to borers and top grafted it to Superior plum. A few years after the Superior top graft was taken over by borers while the part below was left severely alone.

All these trees mentioned are hardy in this region and most are good producers. Precaution must be taken with those subject to borers and to avoid wormy fruit, spraying must be done. They must be supplied with a pollinator like South Dakota or Toka. Personally, I favor the Fiebing and LaCrescent.

Then we have the plum cherries. In our orchard we have tried Dr. Hansen's Sapa — here it seems on borderline of hardiness. We also tried his Oka. It was fine for two or three years. then some of the branches died during the winter. The fruit tastes like a sweet cherry, and it is regrettable that it was not hardier. Hansen's Opata has been with us for many years. It is an early, and heavy, bearer and is a very valuable tree in North Dakota. Hiawatha plumcherry seems hardy. The flesh is dark red and is used mostly for cooking. Hiawatha came from Mandan.

It must be twenty years ago that I gathered the plum pits of the several hybrid plums and planted them in the shelterbelt. I was surprised when they began to have fruit. The plums were all sweet. This shelterbelt was never sprayed yet the fruit was not wormy.

Now, there are only a few plum trees in my orchard but years ago, when I had more varieties, the neighbors would come to try them. Once I had some prospective customers sample the fruit. Then I took them around the orchard and had them taste other, new hybrid varieties. Finally we came back to the first tree. After sampling this again, I was told it was not the tree they had selected. It does not pay to dull the taste by trying too many varieties at one time.

Plums for Prairie Gardens

D. R. ROBINSON

Plums have been grown, to a limited extent, in prairie gardens for at least half a century, but during that period their popularity has not increased to the same extent as has that of the apples and applecrabs. Certain factors such as hardiness, fruiting habits and fruit quality have more or less combined forces to relegate this fruit to the status of a "second class citizen" in our gardens. Today, however, with the introduction of new varieties (and at least one species), a little better understanding of plum culture, and certain minor changes in environment (particularly in urban communities), it would seem to be time to take a second look at plums.

The comments which follow relate to plum species, plum hybrids and seedlings of the latter. We are not, at this time, considering the plum x sandcherry hybrids.

In general the plums blossom during the latter half of May, somewhat earlier than the apples and crabapples. At this time of year the weather is often quite cool; also there may be occasional windy days. Under these conditions honeybees and other insects find it difficult to work and, as a result, there may be a poor set of fruit. This emphasizes the importance of shelter for plum trees, not only shelter in winter time but also shelter at blossom time. Along with all our modern developments, it would be nice if someone would invent "mini-colonies" of bees that could be placed directly in the garden.

As to environment, it seems probable that, in future, many of our fruits will be grown in backyard gardens in the smaller and larger urban centers. Here, temperatures will average a few degrees higher than in the farm garden; there will be less danger from springtime frosts and shelter will be fairly adequate. It is, of course, important to have two or more varieties in the garden as plums are, to a large extent, cross fertilized. According to available information, our hybrid plums are mainly intersterile and cannot be depended on for cross fertilization and fruit setting. For this reason it is important to have one or two trees of the improved native plums in the garden or nearby to ensure cross fertilization. Actually two varieties, one plant of each, would be better than two plants of one variety only. (Native plums are mentioned below.) For the urban garden this brings up the problem of finding room for three or more varieties. Native plums can be grown in the shrub border or in a hedge row. If nearby neighbors planted one or two plum trees this would help overcome the problem. Another approach is for more of our fruit growers to learn the art of budding and grafting. It is not too difficult and in this way two or more varieties could be topworked on one tree.

Frequently a very good plum variety will bloom three or four days before other nearby varieties and, as a result, it may set very little fruit. The keen gardener, who watches his trees closely, and notes their individual peculiarities, can to some extent modify this early blooming habit. A six-inch mulch of leaves, moss or other material, applied in early winter (first tramping down the snow to discourage mice) should delay the time of blossoming of that variety by at least a few days.

It has long been considered a sound practice to water trees and shrubs in late fall, just before freeze-up. This fall watering naturally applies to plums as it does to other woody plants.

The Prairie Plum; private garden, Saskatoon

For convenience, western plums are commonly separated into three groups: (1). native species, (2). introduced species, and (3). hybrid plums.

Group 1: Mainly involves the Canada Plum, *Prunus nigra.* As mentioned above the Canada plums are important as pollinizers for the hybrid plums. Named varieties of this species include Bounty, Dandy and Norther. In general these plums are hardy and fruitful, but they are lacking somewhat in size and quality.

Group 2: The Manchurian plums, *Prunus salicina,* were introduced to western Canada some 30 years ago and have attracted considerable attention because of their hardiness. The varieties, Ivanovka and Mandarin, were named in 1939 and 1941. Certain other selections were released by the Experimental Farm, Morden, Manitoba as follows: Ptitsin 5, 9, 10 and 12. In general these plums are good for eating but they are rather small. More recently, additional selections have been made by the Provincial Horticultural Station, Brooks, Alberta. These are Brooks 40, 41, 58 and 70. Fruits of these selections range from 1½ to 1¾ inches in diameter. Their progress will be watched with interest. It seems probable that the Manchurian plums will prove valuable in the more northerly farming communities where extreme hardiness is essential.

Group 3: Hybrid Plums: This group includes certain old varieties of known parentage and several recent introductions of unknown parentage but of hybrid origin. Because of the limitation of space only a few varieties will be mentioned at this time. Pembina, introduced in 1917, is, perhaps, the most dependable of the older, large fruited varieties. It is a red, 2-inch plum of very fair quality, ripening in late August, and has given a good account of itself as far north as Saskatoon. Ojibwa, also introduced in 1917, is smaller than Pembina and later in ripening. It is of good quality for canning and has been more fruitful than certain other hybrid plums. Of the newer varieties two 1960 introductions from the University of Saskatchewan, Saskatoon, merit consideration. These are Prairie and Supreme. The first mentioned variety is a red plum almost 2 inches in diameter, of very fair quality, both canned and for eating. It appears to be more fruitful than other large fruited plums at Saskatoon. Supreme is a thin skinned, good quality plum, ripening in late August. It is orange in color splashed with light red, and is approximately 2 inches in diameter.

In 1935 G. F. Chipman of the Country Guide wrote as follows: "It seems to me quite safe to say that within a very few years we shall have all the best strains of California plums cross with our own best hardy Manitoba plums and that our new hybrid plums will steadily rise towards California quality and size." It would now appear that Chipman's prophecy, to some extent at least, has been fulfilled.

STEMBUILDER ORCHARDS

H. TEMMERMAN

A study of hardy stembuilder trees for the Prairie Provinces was started at the Morden Research Station in 1954. The main purpose of this research was to correct two common weaknesses in apple trees under Prairie conditions. A number of apple varieties that have been developed or found suitable for the Prairies are structurally weak in the crotches. Narrow, sharp-angled crotches are likely to be more subject to low temperature injury, as well as weak structurally.

Secondly, a number of large apple varieties suffer from low temperature injury in the lower stem and crotch areas even though the crotches have wide angles. This is probably due to late maturity of these tissues in the fall. Therefore it has been suggested that an intermediate stempiece, or stembuilder, of a hardy apple or crabapple with early maturity and wide-angle scaffold branches be used as a framework and that a desirable variety be grafted onto it to form the fruit bearing portion. The conjecture is that the hardy, early-maturing, strongly crotched stempiece will resist low temperature injury and thus enabling the better quality varieties to remain productive in spite of severe winters.

Using stembuilders has become a recommended orchard practice in Northern apple-growing regions where a hardy framework is required to withstand cold winters. The branches and crotches of trees must also be strong enough to carry a heavy load of fruit, stand high winds, and bear the weight of snow in winter. Besides hardiness, an ideal stembuilder should have a smooth, straight stem with limited branch production and optimum placement of the branches.

At Morden, 40 selections were considered to have some potential at stembuilders. Sixteen of them were varieties or species of hardy crabapple which had been under test for many years. The remainder were hybrids, mostly crabapple x apple, which because of parental background should be hardy and which had shown strong crotch structure as seedling trees.

Goodland, a seedling of Patten Greening, and Morden No. 359 a (Wealthy x Melba) cross were used as the two scion varieties topworked to the stembuilders. Both are varieties of large apple with the same season of maturity. Morden No. 359 is considered of borderline hardiness.

The buds of Goodland and Morden No. 359 were placed 6-10 inches from the main trunk on selected scaffold branches to give maximum spread when the shoot developed. Where possible, the first scaffold branch was chosen on the south or southwest side of the tree, 12-15 inches from the ground to prevent sunscald.

The topworking of the trees was continued until 6-8 scaffolds per tree had been topworked. All adventitious shoots or branches of the stembuilders were removed.

Most of the stembuilders formed compatible unions with the two scion varieties. The most useful information coming from this experiment is on variety or selection reaction. Several workers have studied stembuilders and have recommended certain varieties. For example, several authors, **Nelson et al,** advocated the use of *Malus Robusta* No. 5 and described other suitable and unsuitable varieties. Our selections and varieties did not include Hibernal because of its susceptibility to fireblight and only a few of the varieties

used elsewhere are suitable for Western Canada. *Malus Robusta* No. 5 exhibited adequate hardiness, was compatible with scion varieties Goodland and Morden No. 359, formed a good framework and imparted considerable vigor to the scion varieties. Stems and scaffolds were injured somewhat by sunscald. One disadvantage not indicated in this test, but apparent from other trials, is that *Malus Robusta* No. 5 matures slowly in the fall and could thus be subject to early fall frosts.

Most of the selections we tested for stembuilders were selected for hardiness under the rigorous conditions. Those which we consider useful at their present rating for hardiness include:

Dwarf:

Malus baccata 'Nertchinsk'

The framework is very strong, unions are very good and the trees bear well. This selection may prove a useful semi-dwarf selection under our severe climatic conditions.

Vigorous:

Anaros (Antonovka sdlg.)

Stem is very smooth, strong and wide-angled branches; wounds heal over nicely; good unions.

CC-14-45 (Charles Ross x Duchess)

A strong and vigorous tree; very wide-angled branches, strongly anchored; very good crotches; placement of branches also very good; a very smooth stem.

All stembuilder trees were worked over in 1961 and by 1967 some of the vigorous stembuilder selections produced over 200 lbs. of fruit per tree.

The location is very important. Avoid low spots and areas with alkali. Fruit trees do best on fertile, well-drained soils. Protect them with shelterbelts to reduce the force of drying winds and prevent damage to trees and loss of fruit at harvest time. For the last couple of years we have painted our young fruit trees in late fall to prevent sunscald. We applied a white indoor latex paint when the trees were dormant and the leaves had fallen. Use repellants to protect trees against rabbits and mice.

A circular describing techniques and results in this study at Morden is available from the Manitoba Department of Agriculture. For further information contact your local Agricultural Representative who has several helpful publications on hand.

MUCKLE PLUM — A PLUM-ALMOND HYBRID

P. M. MORAN

The extensive range of plant material available from our Western Canadian nurserymen is due in part to the many individual plants brought here for trial from other parts of the world which have been found to grow here successfully.

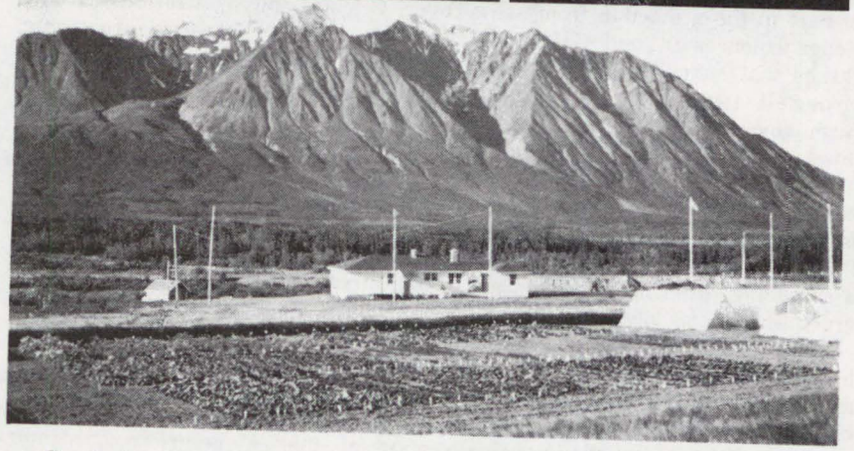
Some are cultivars which have arisen from species as a result of plant variation. The weeping habit of the Jumping Pound Pincherry is a typical example. The dark purple or deep red foliage of the Schubert Chokecherry, which originated south of the border, is another well known example. Many others, however, are ones which have been specifically developed for Western Canadian conditions by various horticulturists and publicly supported institutions on the prairies. A number of these have been flowering woody ornamental hybrids which have resulted from controlled crosses between species of the same genera. The work accomplished at the Dominion Experimental Farm at Morden with various species of the genus *Prunus,* has produced some worthy introductions, such as the Prairie Almond.

One of the most interesting and perhaps least known plum-almond hybrids introduced to Western Canada, however, is a plant called the Muckle Plum. The plant was originally received by the Dominion Experimental Farm at Morden, Manitoba, prior to 1949 from a Mr. Robert M. Muckle of Clandeboye, Manitoba. He had successfully crossed the Canada Plum (*Prunus nigra*) with the Russian Almond (*Prunus tenella*), both of which are quite well known and completely hardy to prairie Canada. As a matter of fact, the Canada Plum is native to Manitoba and north-western Ontario, and has a fragrant white bloom during mid to late May. It develops in height to ten or twelve feet. The Russian Almond has pinkish flowers developing at an earlier date which are produced on low growing branches up to two and one half or three feet. The hybrid plant produced by Mr. Muckle is botanically referred to as *Prunus X nigrella.* Following Mr. Muckle's death in 1952, the Morden Experimental Farm accorded the common name Muckle Plum to this plant. The original specimen grown at Morden over a period of fifteen years has developed to a height of nine feet with a seven foot spread, and could be considered a globular, densely compact specimen plant. It would not be unusual for this shrub to develop to a lesser height in the Regina area. However, it has not been grown here for a sufficient length of time to determine its ultimate height. The plant combines a number of the better characteristics of both parents and improves on still others. The pinkish flowers of Muckle Plum are quite vivid and appear to have less purple colouring or muddiness than those of the Russian Almond. The single flowers are borne profusely over the whole plant on branches with undeveloped leaves in mid-May and it is the delicate nature of the blossoms, proportioned to the scale of the branches, which adds to its appeal. It does not have the heavy double flowering characteristics of other ornamental plums and cherries but the large numbers of flowers produced makes it a striking picture in bloom. It has the lustrous, gunmetal-grey coloured bark of the Canada Plum and these branches supporting the pink blossoms are a complementary feature. The prominent lenticels found on the bark of Russian Almond are carried into the Muckle Plum but in fewer numbers.

Many of our ornamental plants are subject to iron deficiency problems on our high lime soils but the Muckle Plum does not appear to be inherently weak in this regard. It retains its somewhat glossy, green leaves throughout the summer without the normal chlorotic yellow colour becoming apparent. Since it has failed to produce any fruit, it is considered sterile and probably accounts for its reliable and colourful display each spring. The lack of fruit production, however, does result in the propagation of the plant being pretty much confined to vegetative propagation, which no doubt accounts for the limited availability of the plant.

MY EXPERIENCES WITH GARDENING IN THE YUKON

G. H. GUBBELS



Gardening in the Yukon can be both challenging and rewarding. The growing season is short and cool, yet many horticultural plants thrive when suitable cultural practices are followed and when due care is given to the choice of plants. It is essential to select only the annual vegetables and flowers

which grow rapidly and mature before severe fall frosts. Also, it is important to choose perennial plants which are not injured by low winter temperatures.

The soils in the Yukon usually are cold, poor in organic matter, and low in relative fertility. However, satisfactory growth of many crops may be obtained by using chemical fertilizers and good gardening practices. In most years garden plants benefit from irrigation as rainfall during the growing season usually is low, approximately four to six inches.

Most of the cool season annual vegetables and flowers may be grown successfully without protection. Vegetables such as lettuce, cabbage, turnip, and carrot, and flowers such as African daisy, Pot marigold, stocks and phlox, do well. Warm-season crops such as tomatoes, cucumbers, beans and corn generally do not thrive in the open field in the Yukon because the growing season is too cool and too short. Light frosts are not unusual during the summer in some areas and glass or plastic-covered greenhouses or crop shelters must be used to grow these crops successfully.

Certain methods of growing plants outdoors can be used to advantage. For some vegetables, plastic mulches help to hasten maturity and improve yields by raising soil temperature and conserving soil moisture. Yields of some crops may be improved if protection from frost is given. The growing season may be considerably extended by protecting the plants during a few frosty nights in August and early September. Sprinkler irrigation can be used for this purpose. Low rates of water sprinkled continuously beginning when the temperature falls below 32°F. and ending when it rises above 32°F. protect the plants from injury. Plants have been protected when temperatures were 20°F. and even lower. This practice can also be used for extending the season of some annual flowers.

The choice of perennial plants grown in the Yukon is limited by the severe winters. All plums, crabapples and pears were killed to the snow level each winter. Gooseberries, raspberries and saskatoons were the only bush fruits that survived. Many commercial varieties and strains of strawberry have been tried but none were found to be consistently winter-hardy.

Perennial flowers that have proven winter-hardy include delphinium, peony, daylily, gaillardia, Iceland poppy, and Speedwell. This may be done in part to the protection from snow cover. Oriental spirea, Altai Scotch rose, Hedge cotoneaster, and Golden Clematis are the only imported ornamental shrubs that have survived the northern winters. Native shrubs such as bush cinquefoil, two native junipers and buffaloberry are useful for landscaping. Bush cinquefoil grows to three feet in height and produces roselike-yellow flowers throughout the summer. One of the junipers (*Juniperus communis*) is a low, spreading evergreen which grows to a height of two feet and is useful in mass planting for ground cover. The other juniper (*Juniperus horizontalis*) is an evergreen that has long, trailing branches with bluish, gray-green foliage. Its prostrate type of growth makes it ideal for ground cover. Buffaloberry is a spreading shrub in the Yukon and grows three to four feet high with leaves green above and silvery below. This shrub is useful for foundation planting.

The Mugho pine is the only imported ornamental tree that appears to be winter-hardy. Several native trees, however, can be transplanted easily for use in landscaping. They are lodgepole pine, paper birch, white birch, dwarf birch and willow. All grow well and produce good specimen trees.

Despite the limitations in choice of materials that can be grown, gardening can be exciting in the Yukon. A well tended garden may supply a good variety of vegetables. Certainly the home grounds can be attractively adorned with colorful annual and perennial flowers, trees and shrubs, many of which are indigenous to the Yukon.

THE LOWEST TREES HAVE TOPS

HARVEY D. SPARLING

Whatever may be contributed in this article must be construed and accepted as emerging from the experience of an amateur in the field of pomology and thus devoid of any great degree of scientific value. I envy those who have a sound basis of fundamental understanding, through scientific research, in the varying branches of horticulture. I have had to be content, however, with accepting some of the well known botanical truths and making observations as a result of experimentation along the line of trial and error.

It is doubtful if there is any better stimulant to the joy of life than watching the progress of one's plans and activities, making corrections along the way, and dealing effectively with successes or failures, but always being willing to accept the truth whether it has coincided with one's previous belief or not. Probably no other activity of life offers the fulfilment of this philosophy to a greater degree than the practice of horticulture, and most certainly the hobby of fruit growing on the Prairies, with all of its hazards, must produce the greatest long term basis for proof of this thesis. Watching the process of growth and development is a fascinating experience.

Nature's wonders have always intrigued me, but I first linked up with it in the production of a few fruit trees about seventeen years ago. The first tree was a Siberian Rosybloom Crabapple — a very humble beginning. However, that original tree now produces many varieties of standard apples, apple crabs, crabapples and pears, and several more grafts and buds will come into production in the future.

The following year I heard about dwarf apple trees, and despite warnings that trees on dwarf roots would prove tender, and would not likely survive on the prairies, I determined to experiment. I was fortunate in being able to obtain from Brandon, Manitoba, Breakey and Red Melba trees on Malling No. 7 dwarf roots. Later I acquired Goodland, Miami and Haralson. This was the only source of supply of the hardier varieties on dwarf roots in Manitoba and, as far as I know, there is none now, except imports from Ontario and British Columbia.

These two year olds were planted and two years later produced apples equal to any I had seen or tasted. It was difficult to believe that these little trees not six feet high could produce in two years, large apples ordinarily expected on tall trees six and seven years old. Johnny Appleseed (Chapman) would have winced at the thought of these little fellows taking the place of his towering thirty and forty footers. More dwarfs were added until there

were over fifty fruit trees including apples, pears, plums, cherries and crab-apples on a residential property in the heart of the city on a lot 70 feet by 200 feet.

Then for dwarf trees came the disastrous winter of 1962-63. Low temperatures of 25-30 below zero and no snow cover until the middle of January. Our losses were heavy where no mulching or mounding was done, especially among the younger trees. Observations convinced me that the dwarf root systems were more tender than the standard root systems. Incidentally, the low temperatures without snow cover practically wiped out the young dwarf nursery stock of my source of supply in Manitoba. However, most of the older trees survived as well as those which had been mounded and the casualties were replaced with dwarf trees from Ontario, including Red Melbas, Yellow transparents, Delicious, Northern Spy, McIntosh Red and Cortland. The Red Melbas and Yellow Transparents have survived and produced well, but the others are too tender for the Prairies, although there has been some production from the Mac Reds and Cortland despite a degree of winter killing to the framework of the trees.

Then in the spring of 1964 twenty-five East Malling No. 7 Root stock, which had been imported from Holland, were planted in a new orchard in the country. These were budded in August of that year with Breakey, Garland, Carroll, Miami, Goodland, Empire Red, Lubsk Queen and Spartan. All of these have survived and produced and although they are mainly Morden Experimental farm originations with a view to hardiness, most of them are, in my opinion, equal in quality and flavor to anything on the commercial market.

Now in two small orchards of roughly 300 fruit trees there are over fifty dwarf apple trees, nearly all of which are bearing and many of which have been bearing continuously for many years. The original dwarfs of sixteen years ago have yielded large crops each year and have to be severely thinned at the risk of appearing egotistic, but realizing that this is a brief for the dwarf apple tree, it is a fact that in seven of the last nine years, apples from our dwarf trees have been adjudged the Champion standard apples of Manitoba. In one of the other years, hail damage prevented exhibition. This must bear some weight in my argument for the dwarf.

It is realized that our zone no. 2 is more favorable for fruit growing than the other higher numbered zones on the Prairies, but I believe that if proper precautions are taken, the dwarf tree will survive wherever the standard tree of the same variety will survive. It is doubtful if any quality apple trees will survive on the Prairies without shelter from the chill of the north and west winds and preferably all winter winds. Most quality apple trees are subject to Winter Sun scald and the result of experiments has prompted me to take these precautions:

1. Keep the trees low branched and try to plant the tree so that a low branch points to the south-west. There is little difficulty on this score with the dwarf tree.

2. Paint the stock and part of the main heavy branches and especially the main crotches with a rubber based paint.

3. Probably most important. Do not let the trees go into the winter dry. I cover the roots to a depth of four or five inches of water just before freeze-up so that during the winter the tree will have some moisture in it with which to perspire when the strong January, February and March sun hits it with its scalding effect.

4. Mulch or mound up the root base on the dwarf trees for winter.

The innovation of the stembuilder system for trees with a dwarfing instinct which is now taking place at the Morden Experimental Farm gives great

promise for overcoming a great deal of our sun scald difficulty and for providing hardier trees.

In planting the dwarf tree it is essential that the graft should not be too far below the surface of the ground if the dwarfing instinct is to be preserved. Otherwise, there will be new roots take hold above the graft after a few years and while the tree has produced as a dwarf earlier than a standard, it will develop as a standard tree when the new roots take over. It may be necessary to support the dwarf for a few years with a stake or post as the roots are shallow and fibrous and do not provide the same support as the roots of a standard tree. Due to the shallow root system it is also wise to mulch the roots to help conserve moisture in the soil.

As is the case with all fruit trees, if size and quality fruit are to be harvested, the dwarf requires at least 21 inches of water during a season and will do better with 30 inches. Our average precipitation is only 13-14 inches, therefore two or three waterings of 4-5 inches each should be added.

The dwarf tree will produce a fabulous number of apples for its size but to reap such a crop a great deal of thinning must be done after the ovary has swelled to a size where it can be cut off, just as must be done in commercial orchards.

The same attention to pruning and protection from insects and diseases is required for dwarfs as for standard trees but, peculiarly, dwarfs that are heavily pruned seem to hold their prolific bearing propensity, unlike the standard trees which are reduced in bearing by extremely heavy pruning.

Space is no longer a problem for any home owner who wants to have some apple trees on his property. With the right selection, a satisfactory small orchard can be fitted into the average city lot.

To sum up, dwarf trees not only have productive value but great decorative value. They may be spaced no more than ten feet apart, will probably not grow more than seven to ten feet high in ten years, and will likely produce some fruit two to three years after planting. They are much easier to maintain, the fruit can be harvested without difficulty and the production is ample for any non-professional fruit grower. In fact, many commercial orchards in North America have switched to the dwarf or semi-dwarf trees. I am also satisfied that they can and do produce larger fruit, of a better quality, but this may be a controversial statement.

I hope the above creates enough interest that some readers will try to prove or disprove my contention by active experimentation.

MONEY GROWS ON TREES

GUNTER A. SCHOCH

Landscape contractors, nurseries, and developers have become aware of the fact that "money grows on trees", provided the trees are large enough and can be moved economically to the desired location. For many years this has been attempted with all types of time-consuming equipment. The result was that the owner often ended up with an unreasonable bill in comparison to the value received.

However, this state of affairs has drastically changed since 1964. The Vermeer Manufacturing Company in Pella, Iowa, introduced their revolutionary tree mover. This powerfully built machine has proved satisfactory under rugged working conditions, providing relatively low cost "instant shade." It is equipped with two hydraulically-operated cutting cups which:

a. will cut a 7' diameter x 40" deep receiving hole;
b. will dig and ball a tree up to 12" trunk diameter
c. will lift and carry the tree and its 7,500-lb. earth-ball over any distance;
d. and will set and plant the tree automatically without hand labour being involved.

The entire operation is controlled by a series of hydraulic levers.

It is obvious that not only commercial contractors but also public agencies would be interested in this promising piece of equipment. In the spring of 1966, the Parks Department of the Metropolitan Corporation of Greater Winnipeg purchased a trailer model of the Vermeer tree mover, available in Canada for approximately $15,000.

A tandem truck serves as towing vehicle for the Tree Mover. A 500-gallon water tank, mounted on the truck, adds the necessary weight and allows for immediate watering of the newly transplanted trees. The machine has been in operation during the months of May to December, in any temperature ranging from 0 to 80 degrees F. During the past three years, approximately 540 trees of 3 - 14" trunk diameter have been transplanted with the Metro Tree Mover, including 40 spruce trees of up to 35' heights. So far, a survival rate of 90% has been experienced, with better results in protected areas, and higher losses on extremely wind-swept sites.

Due to the heavy soil conditions in the Metropolitan Winnipeg area, the average time period for the moving of one tree amounts to three hours. This includes transportation over a distance varying between a few feet to 15 miles. The total moving cost amounts to approximately $50.00 per tree.

The high cost in tree moving over a greater distance can be overcome by the implementation of a different moving technique in the late fall. The trees are cut out only by the tree mover. Then they are placed on the ground at the digging site and allowed to freeze. After a few days, a solid frost ball develops and the trees can be placed on trucks by front-end loader. The planting of the trees into previously prepared holes can also be carried out by front-end loader. A total of 125 trees already have been satisfactorily transplanted by the frost ball method.

Trees are a great factor in our health, comfort, and sanitation. They help to purify the air we breathe and to modify the temperature in the summer. They help to lessen traffic noises and, finally, trees do increase property value. Considering these facts, the expression "money grows on trees" is not so far-fetched. For a public agency, of course, the value of the tree mover lies in the opportunity to provide the public it serves with truly completed landscape projects. Once in possession of this machine, a Parks Department would not want to be without this method.

Digging hole

Digging by treemover

Digging tree

Moving by truck

Planting tree

Planting by front-end loader

My Favorite Skinner Introductions

D. B. McNEILL

I hardly know where to begin! With a man of Dr. Skinner's abilities, who has produced so much in one lifetime, it is very difficult to single out any one of them for honorable mention. Yet, if I were to mention all of his valuable introductions, there would not be room in this book for anyone else's articles. I decided to confine my comments, therefore, to the hybrids he raised and named, rather than the plants that are favorites, introduced by him from other countries. There were also many fine introductions that have become extinct over the years for one reason or another, so I will dwell only on those items that are available commercially or will be available in the near future.

First and foremost, the lilies Dr. Skinner introduced are by far the most famous, and it was within this region that he attained his first real success in plant breeding. In his early years there were very few lilies available, other than a few species, and he was able to combine these with garden varieties from more moderate climates, to produce the very fine yellow of Lemon Lady and the blood-red of Dunkirk and Dieppe. When grown together in the same bed, Dunkirk and Lemon Lady flower at the same season and complement each other very effectively. Dieppe is upward facing and a bit later than the other two. The Martagon X hansoni lilies were among his favorites in his earlier work, and the tall spires of Black Prince (deep maroon), Juanita (white) and Glacier (white with pink spots) are a sight to behold in June.

As Dr. Skinner's work became more involved he became very interested in *L. centifolium* and used these for many crosses. They were a real challenge as they lacked the quality of hardiness, but he persevered and, although not altogether hardy, we now have *L. centifolium* which are fairly hardy when planted in a well sheltered location and have a good snowcovering. Not many of these have been named as yet, but Cupid (pale pink), Moonglo (lime-green), and Assiniboine Chief (white with pink edge), are beautiful in late August when most of the other lilies are past their best. Several others have been selected for further testing which are a result of the last work he did with these lilies. I am quite convinced that with further work we will eventually have lilies of the trumpet types that will be hardy enough for all parts of the prairies.

It has been stated that if Dr. Skinner had introduced no other plant he would have been famous for his Dropmore Scarlet Trumpet Honeysuckle. This very fine climbing plant does well in most parts of the prairies and is now enjoying wide acclaim in areas where the winter climate is more moderate. The bright scarlet flowers are produced in abundance from June until freeze-up and, as well as being suitable for a trellis, it also makes an attractive border plant covering a large area in a short period of time.

One of his early introductions, the Bella-Dropmore Honeysuckle is an excellent shrub border plant that very quickly makes a fine screen for the back yard. The mass of white bloom in June followed by loads of bright red berries in the summer and fall, gives a fine display of colour all season.

Next to lilies I believe that Dr. Skinner's favorite flowers were lilacs, and he did more with this group of plants than any other. The common lilac varieties were, in many cases, of border-line hardiness and he set out to improve on these if possible. How well he succeeded! For now we have a race of lilacs that bloom earlier, are hardier, more floriforous and are relatively

free of suckers. He introduced many varieties, but my favorites are Assessippi (single, lilac-purple), Minnehaha (single, deep purple), Gertrude Leslie (double, white), Sister Justina (single, white) and Pocahontas (single, red-purple). The above are all hybrids of the French or common lilac and the Korean early lilac from Asia. However, not too many years ago he crossed his hybrids with The Little Leaf Lilacs, and from this resulted one of the finest pink lilacs that we have seen. It is called Maiden's Blush, and although at the moment it is not available commercially, it will soon be on the market and should be well accepted. The Late Lilacs also interested him, and as a result of several crosses he introduced Hiawatha, Hedin, Helen and Donald Wyman. Donald Wyman with its deep red buds is one of the best and puts on a glorious show in late June after the others are past.

Roses were another of his favorite flowers and one of his earliest crosses produced the Wasagaming. This is a very free flowering shrub rose which produces masses of fully double pink roses in June. However, the desire was for roses of the H. T. type and with this end in mind he proceeded to cross the tender roses with the hardy shrub roses, and several fine types were introduced. One of these is the beautiful Will Alderman — a fully double deep-pink rose which blooms profusely in June, flowers intermittently all summer, then in the fall it blooms again with another grand display of flowers. However, Dr. Skinner still was not satisfied in his desire for roses of the H. T. type, and the crosses continued. Many fine roses were produced only to succumb to our rigorous winters but, inevitably, the Dropmore Velvet was introduced with its semi-double red bloom, the petals of which are like rich velvet, and it has wintered well without protection, other than a good snow cover and a sheltered location. We anticipate this rose will have a wonderful future and should receive acclaim wherever it is grown.

Purity Mockorange

Mockorange is a very fragrant and ornamental shrub but the known varieties were not very hardy, and early in his career Dr. Skinner decided to try and improve them. He soon introduced Purity and Patricia Mockorange. Both of these varieties were fine but Purity, with its large, white flowers in late June is a favorite. Its fragrance fills the whole garden! His work continued, and he later introduced Galahad Mockorange which has smaller blooms than Purity but surpasses it in fragrance, hardiness and form. Mockorange does not bloom over a long period and the fine dark brown bark of Galahad makes it attractive all season.

In the 1940's a great deal of interest took place in Rosybloom Crabapples and we had many introductions from prairie plantbreeders. Many of these were excellent but lacked hardiness. This encouraged Dr. Skinner in his search for a rosybloom that would be hardy in north-western Manitoba, and he was soon rewarded with the Rudolph Rosybloom Crabapple (named for its deep red buds). This tree has proven to be one of the best in all parts of the prairies, and a few years ago he was informed by the Morton Arboretum at Lisle, Illinois, that it was considered one of the best in their large collection.

SnowWhite Spiraea

Last but not least in the woody ornamentals is SnowWhite spiraea. This spirea grows to a height of four feet and in July is a mass of white bloom on long arching stems. This spiraea is similar to the Bridalwreath Spiraea (Van Houtei) but is much hardier and should eventually replace the latter on the prairies.

Dr. Skinner's work with herbaceous perennials was mainly the introduction of plants from other parts of the world, but every now and then be concentrated on one or two genus and with his usual skill came up with a valuable contribution. Lythrum has been made famous by the Research Station at Morden but I still feel the Dropmore Purple Lythrum is the showiest and hardiest of the Lythrums in our area. Like all lythrums, it blooms for a long period of time in late summer with long wands of purple flowers.

Clematis var. Blue Boy

Clematis also stirred Dr. Skinner's imagination and he dreamt of a clematis similar to Jackmanni and Villa de Lyon that would be completely hardy on the prairies. He was not successful but he did name several varieties that, with further work, should produce some worthwhile plants. He named a good blue clematis hybrid Blue Boy. This grows to a height of five to six feet and is root hardy with a beautiful show of deep-blue flowers in midsummer. Its behaviour is similar to a herbaceous perennial, that is, the tops die to the ground each year but comes up each spring and continues to give a good show year after year.

These are but a few of the wonderful plants that Dr. Skinner contributed to the beautification of Manitoba and the whole Great Plains area of North America. No doubt I have omitted to mention some of your favorites, and if Dr. Skinner were able to comment, he would likely disagree with my choice in some instances. He had great affection for plants that seeded down the whole garden but put on a glorious show when they were in bloom. To my unseeing eye many were weeds — but not to him!

The plants mentioned are readily available from your local nurseryman or Skinner's Nursery, and all are fitting memorials to a pioneer who had a great dream and spent the most of his life doing something about it.

Potentilla fruticosa
'Coronation Triumph'

SHRUBBY CINQUEFOILS

W. A. CUMMING

Shrubby cinquefoils are valuable low growing shrubs for landscape use. They bloom from mid-June until severe frost in the fall. Very few shrubs grown here produce bloom over such a long period. The flowers, like small single roses, vary from white through cream to bright yellow. They will thrive equally well in full sunlight or in partial shade and are often found growing in nature in very poor soils. They are hardy, quite drought resistant, and can be utilized in hot, dry locations.

The scientific name for shrubby cinquefoil is *Potentilla fruticosa.* This species is native throughout the northern hemisphere and cultivars (cultivated varieties) come from Europe and Asia as well as Canada and the United States. There is a great variation among the native shrubby cinquefoils; some are almost prostrate in form, while others mature to four foot dense, globe-shaped shrubs. Their foliage varies from bright green to grey, leaves are small and finely divided, which accounts for another fairly common name — five-finger bush. Several with semi-double and also some with orange-toned flowers have been found among the natives. To date, no white-flowered North American natives have been found. The white-flowered cultivars originated from Asiatic forms.

Forty-five different named varieties of shrubby cinquefoils and several unnamed native selections are being evaluated in the arboretum at the Morden Research Station. Among those which have so far demonstrated their superiority are the following cultivars:

With yellow flowers — 'Coronation Triumph', *'Farreri', 'Arbuscula'* and *'Forestii'* — the latter two are low growing, spreading types;

With cream flowers — 'Primrose Beauty' and 'Maanleys';

With white flowers — 'Snowflake' and 'Mount Everest'.

The recently introduced cultivar 'Tangerine' has orange-toned flowers which fade to yellow in our bright summer sun. Only in cooler, moist air such as we had during the past summer, or ordinarily in late autumn, is the orange apparent.

'Coronation Triumph' was raised, named and introduced by Professor John Walker when he was Superintendent of the Tree Nursery at Indian Head, Saskatchewan. This new cultivar received an "Award of Merit" from the Western Canadian Society for Horticulture in 1967 and is highly rated by all who have seen it. Its starry, narrow-petaled, bright yellow flowers are adundantly produced throughout the summer. Unlike many cultivars its seed capsules remain green during most of the summer, thus avoiding the untidy look of brown seed capsules which occur on many other cultivars.

* Single apostrophes as shown in this article denotes cultivars developed under cultivation.

BIRCHES FOR THE PRAIRIES

R. H. PATMORE

We are fortunate in being able to grow on the Canadian prairies a number of native species of birch, as well as some of the best varieties of the European birch. Our selection of tree species of all kinds is so limited when compared with those available to the south and east that the variety of birch species here makes us feel we have been especially well cared for with this group of trees.

The distinguishing feature of the birch, except for one species — the native *fontinalis* or water birch — is a white or silver bark. All of them, *Betula papyrifera* — the native paper or silver birch; *Betula populifolia* — the poplar leaved or gray birch; and all varieties of *Betula pendula* — the European birch, have this distinguishing feature.

Fontinalis is the only one that retains its dark brown bark into maturity and throughout its life. It is a native of the eastern prairies, usually found growing along the streams of southern Manitoba. It exists as a shrub birch and grows a large number of stems. The leaves are small and roundish, and foliage and growth habit are attractive. It should be more widely grown as a large shrub or small tree. Unfortunately, it has not as yet been grown commercially, and is difficult to obtain unless dug from the native stands, and these are not easily found.

The native paper or silver birch develops a white or silver stem as it becomes larger, but as small trees, the bark and the smaller twigs are dark brown. It is the most widely existing of all birch, extending in forested areas all across the northern prairies into the Yukon, and growing in certain locations along river valleys in southern Manitoba. It is usually found as single stemmed specimens, although the river valley stands are usually multi-stemmed. It is hardy and will do well in almost any prairie home environment, especially if its moisture needs are taken care of.

The silver birch is favored in most plantings as a multi-stemmed specimen. To get this effect, it is usually necessary to plant three or more together in one hole, arranging them with the roots inter-twined so that they all appear to come from one root. The same effect can also be obtained by cutting back a single stemmed birch to force it to send up several shoots from the base, or by planting a seedling that has already developed several vigorous shoots. Cutting back will often kill the tree outright, however, and the several shoots from a seedling do not usually develop uniformly.

This native paper or silver birch is one of the best for prairie home plantings as it is relatively long lived, always attractive in stem and foliage, and rarely outgrows its surroundings.

Gray birch is native to areas south and east of the prairies, but it has been grown here and found to be fully hardy. It is the lowest growing of the white-stemmed species and seldom exceeds 20 or 25 feet in height under good soil conditions. It seems to stand drought conditions well. When grown multi-stemmed, it is probably the best for the small home lot. Unfortunately it is not available except to a very limited extent. The name does not do it justice as its bark is not grey, but fully as silvery as any of the silver birch.

There is an excellent five-stemmed specimen of this species growing on home grounds at Park Avenue and 24th Street in Brandon, which is well worth seeing.

The above species, *fontinalis, papyrifera* and *populifolia,* are the three native species useful for home planting. In addition, we have several selections of the European white birch *Betula pendula* , which do well here. These are the Cutleaf Weeping, Youngs Weeping and the Pyramidal or columnar white birch. These three are all clonal selections and must be grafted to ensure them coming true to form. Since with Birch this is an expensive process, they usually are more expensive than Birch grown from seed.

The Cutleaved Weeping birch has been the most widely planted of any. Its foliage is finely cut giving it a lace-like appearance, and is carried on long pendulous branches which gives it the name "weeping". These pendulous branches will drop almost to the ground and when caught up by light winds sweep gracefully to and fro. The main stems and branches have a milk-white bark color which contrasts beautifully with the brown of the small pendulous branchlets. This has been considered our most attractive deciduous tree.

When grown with a single stem it is very fast growing, sometimes rising as much as four feet in a year, and because of this it becomes a very tall tree. It is advisable to keep topping it every two or three years to force it into a more dense growth and prevent it getting too tall. It also seems to flourish better if the top branches are cut back occasionally.

This Cutleaf Weeping birch can be grown as a multi-stemmed tree, either by inducing several shoots to come from the base, or by planting three or more together in one hole.

Youngs Weeping birch is the most persistent weeping tree of any. In fact, its branches will not grow vertically unless staked, and for this reason it will only grow as high as it can be staked. From this point it will grow downwards in a cascade of drooping branches. These also tend to grow outward from the tree, and in some cases may form a tree too wide for the grower's purpose unless these outward developing branches are trimmed off. For anyone requiring a small weeping birch that is easily kept within bounds by trimming, this is one of the best.

Pyramidal birch (*Betula pendula fastigiata*) is one of the smaller birches reaching a height of some 25 to 30 feet. The branches grow narrowly upright, close to the main stem, giving it a dense columnar effect. It has dark green lustrous foliage contrasting sharply with the white bark of its main stem and branching. It holds its foliage later than most birches, late into the fall. There have been reports of an occasional winter loss of this tree although we have not had any such loss with it. This loss may be due more to drought

and failure to keep well watered than to winter tenderness. This is one of the best trees for a small lot where a tree of moderate size is desired, and is considered one of the best ornamentals.

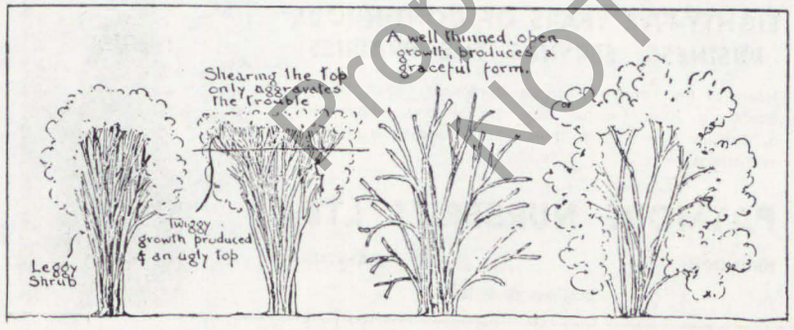
In the park areas of North America and Europe birch do well, but in the treeless southern grasslands, they will not do well if neglected. They grow native along the streams in this area but always on the steeper southern banks which slope to the north, banks which are shaded from the sun and which hold the snow later in spring, and are cooler in summer. It seems possible to reproduce these conditions here by keeping the birch well watered during the hot dry days of mid-summer. This does not mean continually soaking them. A good heavy watering twice a month from mid-June to mid-September will take care of their needs. Let the hose run around the roots for about half an hour each watering. Planting with a good sized depression around the tree helps retain the water. Cutting back the top of the main stem once a year or every second year (this will need extension pruners) will also help. Fertilize occasionally with a well balanced fertilizer, (once every spring is sufficient) but don't overdo the chemical fertilizers.

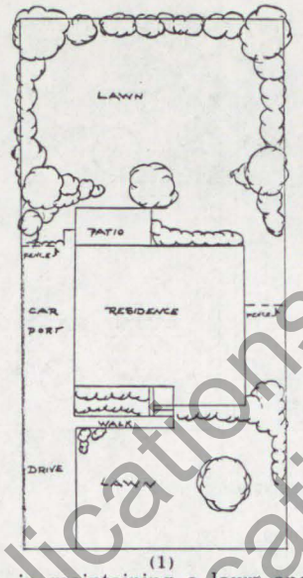
Birch is one tree for which **early** spring planting is a must. It will not move safely in the fall. The best time to move them is from the 15th to 20th of April or a few days later if spring is very late. Once the tree begins to break dormance in spring, it is too late for safe planting, and you will have a 50 percent chance of loss if delayed until May.

Birch is not troubled by many pests. The most troublesome, in areas where it exists, is the birch borer. However, we have never discovered a genuine case of birch borer infestation. Whenever one is reported to us we have never found their inevitable calling card. the borer galleries under the bark. Almost all the losses we have seen have been due to drought and failure to keep the tree well watered. Borer does not affect the smaller stemmed birch and we consider *fontinalis*, Youngs Pyramidal and, possibly, Gray birch, immune to it.

One tree **not** recommended is the seedling form of the European white birch. This is excellent as a rootstock on which to graft better birch, but it is too rank in its habit of growth and too open branched as a mature tree to make a good ornamental. On the prairies, particularly in the drier parts, it is also short-lived.

Pruning Shrubs





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The Planned Home Landscape

W. C. SHELMERDINE

Everyone admires a well planned home landscape. But lack of knowledge on some of the essentials of good gardening practice is a frequent cause of failure to achieve the hoped for results. Thus, the appearance of trees and shrubs, and where and how to plant them, are important. So also is recognition of the time and labor occupied in maintaining a lawn and other landscape features; knowing plant diseases and pests, especially with the endless variety of sprays on the market; and the value of watering and fertilizing generally.

A brilliant display of color, to some people, is essential to a home well landscaped. On the other hand, most authorities consider that a home well landscaped is like the music to a good movie, it is so good that one really is not aware of it.

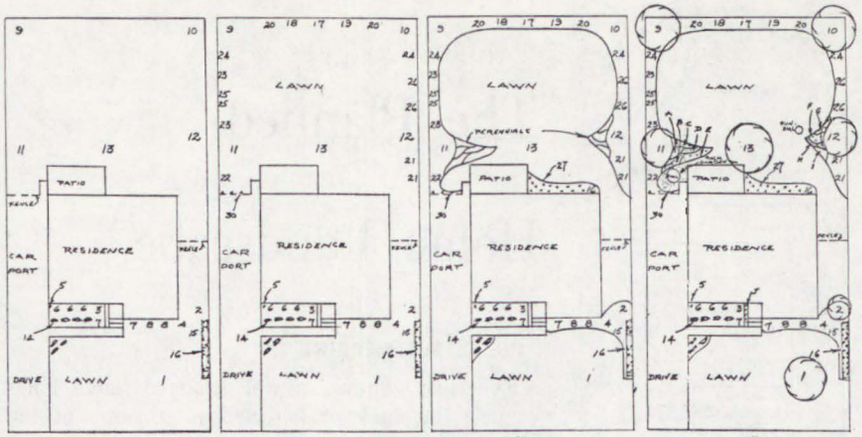
The key note is simplicity and a feeling of permanence. The site should have a hospitable, comfortable look. The plants should not overwhelm one with a multiplicity of variety and color dominating the scene. Good landscaping complements the home and makes the yard a pleasant place in which to linger. There is no urgent feeling to tidy the bed, pull the weeds, cut the grass, fill in the blank spaces; no restless feeling inspired by an over brilliant display of flowers. Rather it gives the impression enjoyed by someone resting in a hammock swung between two solid old trees.

The following suggestions will make planning easier for the amateur gardener and new home owner!

When laying or seeding a lawn, the first and most important step is to put down a four-inch layer of top soil as foundation. This will save much watering, fertilizing and top dressing, and will give much greener and denser growth. Too often some home contractors lay sod on pure basement clay and the unfortunate purchaser buys a sea of trouble. He applies top dressing, fertilizes and waters, and finds that nothing helps. Had the owner insisted on a good underlay of top soil, much repairing and cost would have been avoided.

When making plant beds where heavy clay or gumbo predominates, discard the heavy soil to a shovel's depth, and substitute a mixture of one-third sand and two-thirds top soil. You will find that the plants grow more quickly and the mixture never hardens or cracks. Hoeing in this soil is a pleasure. Add sand to the surface in occasional years.

Plant for permanence. Use trees, shrubs and perennials, with just a spot or two of annuals. Once set, these require practically no replanting. If the project is well planned, the site will improve with the years. Later it may be necessary to remove some plants used originally as screens. In other instances, some judicious pruning will be in order.



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Planned Home Landscape

KEY NAME

1 CUT LEAF WEEPING BIRCH
2 SNOWBALL
3 PYRAMIDAL CEDAR
4 SWEETBERRY HONEYSUCKLE 'DROPMORE SCARLET'
5 TRUMPET HONEYSUCKLE VINE
6 SPIREA IN VARIETY
7 GLOBE CEDAR
8 SPIREA IN VARIETY
9 RUSSIANOLIVE
10 SILVER MAPLE
11 DOLGO CRABAPPLE
12 ROSYBLOOM CRABAPPLE
13 GREEN ASH
14 SAVIN JUNIPER IN VARIETY
15 CISTENA CHERRY
16 PYGMY CARAGANA HEDGE
17 SHUBERT CHOKECHERRY
18 SILVER VARIEGATED DOGWOOD
19 GOLDEN VARIEGATED DOGWOOD
20 RED HONEYSUCKLE
21 FRENCH LILAC
22 DOUBLE FLOWERING PLUM
23 NANKING CHERRY
24 AMUR MAPLE
25 MONGOLIAN CHERRY
26 SIBERIAN DOGWOOD
27 TEA AND FLORIBUNDA ROSES
30 YELLOW TWIG DOGWOOD
A DELPHINIUM
B LILIES
C LYTHRUM
D PHLOX
E CHRYSANTHEMUM
F PEONIES
G MICHAELMAS DAISY
H GAILLARDIA
I IRIS

THESE RECOMMENDATIONS WILL BE SATISFACTORY BUT FINAL SELECTION OF MATERIALS WILL DEPEND UPON EXFOSURE.

Use container grown stock. There is no transplanting shock and much less watering. An added bonus is instant landscaping during the growing season. Trees and shrubs in full leaf, bloom or fruit may be planted without fear of loss. Before removing the plants from the containers you can arrange and re-arrange them until you get them into positions that are completely satisfactory.

Avoid polka-dotting your lawn with trees and shrubs. Grass cutting is much simplified with all shrubs in sharply edged beds with long simple curves, and trees growing in 30-inch diameter circular beds.

Have a plan. It is possible to have a bad plan, but the mere idea of sitting down with a rough plot plan of one's home site and a local nursery catalogue is the beginning of a better yard. As you go on, advice is needed, and pictures also help. A visit to your University, Experimental Farm, Arboretum or Nursery Garden Center, especially in the active growing season, tells you most of what you need to know to position each specimen effectively. Ask your nurseryman about the pros and cons, generally he is quite willing to talk if it is a weekday. It is in his own self-interest to do his best to please you.

A good plan is drawn to scale in order to show the exact distances between shrubs and the correct number required. If this is beginning to get difficult, ask your nurseryman to draw the plan for you. Usually he does this free of charge if you give him your measurements. It is best to telephone ahead to find out what dimensions are required. Most likely he will draw in

everything, even to the point of showing exactly where each plant goes, where the beds are placed, and the approximate area that each tree will occupy.

If you are drawing your own plan, do not become involved with details at first but rather get the overall theme on paper. For instance, Figure 1 could be your first conception of what the yard would look like with fairly mature plants. First, begin with the larger plants, and by putting key numbers in the more important tree and shrub positions you have the basic plan started. Put the number exactly where the trees go. The order of the numbers in Figure 2 is roughly the order in importance of the plants. Next, fill in between the above plants with the less important plants (Figure 3).

Now outline beds and fill in perennials, roses, ground covers, etc., as shown in Figure 4. Finally, end with the perennial bed details, rock garden, and any other feature such as water falls, sun dial or fountain (Figure 5).

To control pests most easily, have an all-purpose spray on hand; this keeps most pests and disease under control. Spray routinely about six or seven times commencing about May 15 and then at two-week intervals. You may need Kelthane for red spider on evergreens and possibly Agristrep for fire blight on crabapple trees, but aside from this there is very little else needed. If you have trouble, help is available by telephoning or writing to your Provincial or Federal Department of Agriculture. Tell them the ingredients of the spray you have on hand.

When watering, leave the hose on one spot for a long time and water only during dry periods, and then only at lengthy intervals. There is no point in watering lightly every day; in fact it does more harm than good.

Fertilizing is well worth while. The average person cannot be too precise about any aspect of gardening. One learns from personal experience that to concern oneself with different formulas is confusing. I suggest, therefore, that you settle on one kind, say 16-20-0, and use it at all times and for all needs, for lawns, trees, shrubs, beds and gardens. Even for house plants a minute quantity is as satisfactory as some of the small 25c packages and certainly many times cheaper.

To summarize, have a plan, go slowly and do the preliminary work well. Make it simple to avoid heavy maintenance. Gardening is one field of endeavor where it is possible to enjoy a project and yet add to the value of one's property and contribute to one's well being.

Good luck.

LOW GROWING JUNIPERS OF MERIT

W. A. CUMMING

In modern landscape design there is an increased emphasis on low growing evergreens both as ground covers and in foundation planting. Among the creeping juniper, *Juniperus horizontalis,* cultivars are several which make low, six inches or less, solid mats of green or blue-colored foliage.

Two outstanding new cultivars of *Juniperus horizontalis* have been selected from native forms growing in Alberta, one in the northern and one in the southern part of the province. 'Dunvegan Blue' was selected and introduced by John Wallace of Beaverlodge and 'Prince of Wales' came originally from the former E. P. Ranch near High River, and was named and introduced from the Morden Research Station.

'Dunvegan Blue' creeping juniper has needle-like, fine, feathery foliage with a long lasting, white waxy bloom on the needles which is responsible for its bluish color. It forms a feathery mat about six inches in height and several feet in diameter. Six-year-old plants have a three-foot spread. At Morden we consider it superior to any of the blue-colored creeping junipers presently available, and it retains its blueness better. Mr. Wallace received an 'Award of Merit' for this juniper from the Western Canadian Society for Horticulture in 1967.

'Prince of Wales'creeping juniper forms a dense, low mat of green, seldom more than four inches in height. The needles are scale-like and cling closely to the branches. A mat of this cultivar (figure 1), in the arboretum at Morden, is 14 feet wide and 67 feet long and completely covers the ground. Twenty-six small plants were originally used in this planting in 1951 but they now have merged so that it is impossible to pick out individual plants. Sides and ends have been kept trimmed to keep it within bounds, otherwise it would be wider and longer.

Waukegan juniper, *Juniperus horizontalis* 'Douglasii' and Andorra juniper, *Juniperus horizontalis* 'Plumosa' are both older cultivars, the former blue, the latter green, which are quite satisfactory and, for the time being at least, easier to secure than the two more recent introductions discussed above.

Two cultivars of the Savin juniper, *Juniperus sabina,* are recommended where a taller growing evergreen is required, either as a ground cover or in foundation planting. Arcadia has dark green foliage and matures at three feet in height, Skandia has finer foliage with a slight silvery tinge and is somewhat lower growing, about two feet in height. Figure 2 shows Skandia in the foreground and the low creeping form next to it is *Juniperus horizontalis,* 'Douglasii'.

Another low growing native species is the common juniper, *Juniperus communis* . No doubt some excellent selections could be found growing in the wild. It is generally more open in habit and does not make a good ground cover. It does, however, make an excellent vase-shaped specimen plant about three feet in height. When grown in a well protected location Pfitzers juniper, *Juniperus chinensis* 'Pfitzeriana' makes an attractive three to four foot specimen.

Junipers are quite tolerant of hot, dry locations and will also do well in partial shade. Because of their tolerance to heat they are one of the few dwarf evergreens that can be recommended in our climate, for southern

'Prince of Wales'

'Skandia' in the foreground

'Douglasii' the creeping one

exposures. If they are planted in very dry locations, such as under a wide eave, they require a good watering several times during the growing season. Like all evergreens, a thorough watering in late fall will do much to prevent winter browning.

Some Caraganas Are Useful Ornamentals

H. T. ALLEN

For several decades the Common Caragana, *Caragana arborescens,* has played an important role in field and farmstead shelterbelts, and has been extensively planted in rural and urban gardens for hedging. It is long lived, easy to establish, grows quickly, responds well to trimming and heavy pruning, will withstand considerable abuse, and all in all is a rugged individual with an ability to thrive under a wide range of conditions.

Because of these many attributes the Common Caragana has enjoyed a popularity that few if any plants can match. Unfortunately, this very popularity is proving to be undesirable, not to just this particular species, but also to other members of the genus. Most people are familiar with it, so much so, that when caragana is mentioned in ornamental terms, opposition to it is automatic and considerable selling becomes necessary ot convey the fact that other species and varieties are decidedly different and may have a place in the landscape.

One example of this is the Pygmy Caragana, *C. pygmaea.* As the name implies this is a dwarfish plant with small leaves, flowers, spines and seed pods. Growth is slow and dense and thus it is ideally suited as a low formal or informal hedge. It finds additional use in group or foundation plantings particularly in sunny dry exposures. Another dwarf type is Tidy, a selection of *C. frutex* var globosa. Like the Pygmy, it is slow growing and dense in habit, but as the leaves are larger and brightly colored it is more desirable as a foundation or specimen plant. A real oddity is the Shagspine Caragana, *C. jubata.* This species is quite unique and of little ornamental value other than perhaps as a point of interest in a border.

Another example of the diversity to be found in the caraganas is the Fernleaf Caragana, *C. arborescens Lorbergii.* This is a mutant of the Common Caragana and is available as a single or multi-stemmed plant or as a graft on a standard. The grafted form produces a small-headed tree with slender arching branches, narrow feathery foliage, and produces an abundance of the familiar yellow flowers in June. To realize its full potential it should be given a place or prominence in the landscape and definitely should not be grown in a crowded situation. The graceful arch form of the Fernleaf contrasts sharply with the stiff coarse appearance and true weeping habit of the Weeping Caragana, *C. arborescens pendula,* when grown as a grafted standard. The latter has limited ornamental value.

An often sought after plant form to the other extreme, is the pyramidal type that is so well represented in milder climates by the Lombardy Poplar. There is an upright growing form of caragana known as Sutherland, a selection of *C. arborescens* and similar to the species in all respects except for its habit of growth. With the range of adaptability of the Common Caragana this selection should not be overlooked where requirements dictate a need for a columnar plant type.

The foregoing are a few members of the caraganas that are quite far removed from the so common, Common Caragana; and some of these at least are worthy of receiving more consideration as landscaping subjects than they now receive. Many more are mentioned in the literature and listed by the trade, so that the choice is substantial.

Ten Hints For Wintering Roses

W. J. EMERSON

1. Withhold fertilizer and water in September in order to give wood a chance to ripen.
2. Collect protective material — boxes (without bottoms and loose tops, about 12" - 14" square, with air holes around sides near top) or tubes of heavy cardboard or metal stovepipes, 10" diameter or more, with holes around top, or fiberglass wool batts, chick wire. Use dry material for filling boxes and tubes, such as peat, soil, leaves, flax straw, etc.
3. Spray roses with fungicide and insecticide.
4. As soon as ground is frozen and before heavy snow, place boxes, tubes, or a chick wire fence around bushes, fill with dry material (plants can be tied up with string), and cut back just enough to fit boxes, or wrap with fiberglass insulation batts (wax side out and tied at top). Tin soup cans with bottoms cut out should be placed on sides here and there amongst the plants. One and a half teaspoons of mouse poison should be placed in each can as mice can work havoc with roses. When using chick wire, leaves, particularly oak, are best for filling.
5. Place wood tops on boxes and plastic or canvas cover on tubes or over chick wire in order to keep material inside dry. Take care not to cover air holes on sides.
6. Cover with flax straw in and around covered plants. Old Christmas trees can also be utilized in this way.
7. Dig pit on north side of building or other shady spot for standard tea roses. Pit should be deep enough to cover plants; other roses can also be wintered in pits.
8. Roses should be placed in pit before ground freezes — but as late as possible. Dig plants, tie tops and place in pit, with roots at one end. Fill pits with soil and heap excess soil on top.
9. Cover pit with straw, evergreens or other rough material to hold snow.
10. Don't uncover too soon! In spring, remove covering by degrees at about the time tree buds are starting to swell. Roses in pits can be replanted when frost is out of the ground.

    Climbing roses should be grown on a hinged trellis, so it can be folded down on the ground. Similar treatment may be given to standard roses, covering with soil or leaves.

    Standard roses, if planted in 12" - 14" standard pots and plunged in a rose bed, will avoid the shock of replanting annually, and can be pitted, pot and all.

If any readers have new or more efficient ideas, the editor would be pleased to receive a report of their methods.

Winter Storage of Gladiolus, Dahlias, Cannas and Tuberous Begonias

W. J. EMERSON

The preparation for the storage of root crops, not only of the flowering varieties but also the food types, begins soon after spring planting. Only well grown and disease-free roots should be stored; this means attention to the food and water requirements and control of insects must be attended to during the growing season, and runted or diseased plants should be rooted out.

During the growing season, roots should be left in the ground as long as possible in the fall but lifted before any ground freezing. Frosting of the tops is of benefit for all except tuberous begonias which should be protected during the first light frost, and lifted before serious freezing. The special treatment required for gladiolus, dahlias, cannas, and tuberous begonias follows:

Gladiolus

Besides the above general rules, when cutting the flower spikes, care should be taken to leave two or more pairs of leaves as these are necessary to nourish the corm. Gladiolus should be dug some time after the frost has killed the tops; the tops are cut off about three inches above the corm, dirt shaken gently off, and the corms placed in shallow trays or flats. They should be kept in an airy, warm place to dry. After they have cured for a while, test to see if the top will break off with a twist and the old corm at the base of the new one can be pulled away with the fingers without too much effort. If so, the corms are ready to be cleaned. This can be done any time in very late fall. Remove the old stubs of the tops and old corms at the base with some of the husks. The cleaned corms should be put in a paper bag and a teaspoon, or more of 5% DDT powder added to control thrip, depending on the amount of corms. Shake them up to coat the corms well with DDT and leave in closed bags for a week, then remove and store in a warm, dry spot with good air circulation — old nylon stockings or mesh onion bags are good for hanging from the basement ceiling. Do not allow the temperature to drop to freezing. During any of the handling periods, diseased corms should be discarded. Gladiolus should be planted out as soon as soil can be worked in spring.

Dahlias

Except for the small bedding types, I have found that it doesn't pay to store the larger flowered varieties as most of the tubers do not mature enough. As the average home owner only wants half a dozen or so, he can purchase newer disease-free kinds in the spring at far less than the cost of peat or other material needed to store them. However, many like the challenge of trying to winter them; and any area where potatoes keep well will suit dahlias. Temperatures should not be too high — around the low 40's — nor air too dry.

Roots should be dug as late as possible to give tubers time to ripen, and great care should be taken in digging, as tubers are quite brittle. If soil should come up with digging, leave any adhering and place the clump upside down in a tray on the floor of a frost-free area. After they have aired and dried for a few days, most of the soil will fall away. The clump of tubers can be divided or stored as they are. I like to cut them before storage as they take less space and time is at a premium in spring.

In dividing dahlias, care must be taken to have a piece of the stem on each of the tubers, or groups of tubers, as this is where the bud for next year's plant

arises. In cleaning up dahlia clumps, the tops should be cut back to about one to two inches from tubers. All weak, thin tubers should be removed, and roots at the end of tubers cut. Let dry for a few hours before packing.

For the storage medium I have found Horticulture Peat the best. Dust the tubers with powdered sulphur (if you have it) and place a few handfuls of peat in a plastic freezer bag, add tubers and peat until filled, and label. If peat is a little moist, leave bag open; if very dry, seal. Store at above freezing temperature, but as cool as possible, in a dark place. Check bags during the winter. If the bags begin to sweat, open and air for awhile; reclose. For the novice, I would suggest that he ask a dahlia grower, or his Horticulture Society, to demonstrate the dividing of dahlias, as there is a trick to this which is hard to put on paper.

Cannas

With the modern style home, cannas are coming back. The winter care is similar to dahlias — cut the tops back after freezing; dig the clump, leave adhering soil, and place upside down in a warm, airy place to dry. When soil has dried, shake old soil from clump and pull apart so that you have a piece of old stem with a new shoot which emerges at the base of the old growth. Then take a knife and cut the old stem as close as possible to new growth. Remove all thin roots and rotten pieces, let dry over night, dust with sulphur, pack in boxes — a layer of peat and a layer of cannas — until all are packed. Store in a warm, dark spot between 45-50 degrees. Check during storage for drying out; it may be necessary to moisten peat a little during storage but take care not to over moisten.

Cannas must be started early indoors, about the first of March. They must be kept quite warm during sprouting time — the warmer they are, the faster they grow; they also require moisture at all times. The great drawback to home growers trying to start their own cannas is lack of a greenhouse or sunny, warm porch.

Tuberous Begonias

These tubers should be dug before freezing. Dig them with a ball of soil, place in a flat, side-by-side until full. If pot grown, just leave in pot, but do not remove tops. Place in a warm, dry spot and withhold water. When tops and soil have dried up it is time to clean them up — the tops will come away clean. Gently remove soil; the skin on tuber is very thin and easily bruised, so just take soil that will come easily; do not try to clean off all the roots. Begonias should be stored in a temperature in the 40-50 degrees range. The storage medium can be peat, vermiculite, or other dry material. Store in boxes, alternating bulbs and medium. Do not store in too deep a container, as the bottom tubers have a habit of sprouting early and you may find you have sprouts five to six inches long. Check your bulbs now and then during the winter and if they start sprouting too early, remove from storage box, arrange a layer of peat in a shallow flat, and place the tubers in this, with the top up. Just cover with peat, dampen and place in a cool light window; keep just moist enough to prevent shrivelling. They will grow a little but will not be straggly. Begonias are usually started in March. Pot grown ones can be stored in their pots and cleaned up before planting.

Assiniboine and Cuthbert Grant Roses

H. H. MARSHALL

Assiniboine

Cuthbert Grant Rose

The world's finest roses are produced by the hybrid tea and related classes of roses. These are the product of hundreds of years of breeding but unfortunately they are not adapted for use where winter temperatures fall far below zero. Many methods of protection have been tried, but losses occur even with the best of care. Crosses with hardy species usually give pink flowered types that bloom only in June or early July.

The breeding program at the Research Station, Brandon, Manitoba has been aimed at combining the long flowering habit of the common rose of the open prairies (*R. arkansana*) with a bright colored good quality bloom. Two varieties have been named and released to plant propagators.

Assiniboine (Donald Prior x R. arkansana, F_1) was released in 1962. It was given an Award of Merit by the Western Canadian Society for Horticulture in 1965. It is primarily useful as an ornamental shrub forming a dense mass to 3.5 feet in height. Flowers which form in corymbs or singly, are borne in July and occasionally throughout the summer. Flowers are moderately large, with 10 petals of a strong reddish-purple color (10 RP 3.5/10 Nickerson) with yellow stamens. Tips frequently winterkill but established plants flower freely, even when cut to the ground in the winter. It roots well from softwood cuttings (slips).

Cuthbert Grant [Crimson Glory x (Donald Prior x R. arkansana)] x Assiniboine was named and released in 1967. It resembles the hybrid tea roses in many ways and can be used where that type of rose is desired. It is less winter hardy than many shrub roses but roots have survived without protection every winter since it was first grown in 1959. Regrowth is rapid from the lower stems so that flowers are produced from July to October.

Cuthbert Grant is a vigorous plant to 3 feet in height with large clean foliage. The large dark red blossoms with 15 firm petals are borne in clusters of from 3 to 6 on new growths. Softwood cuttings root freely.

I'M A LAZY GARDENER

F. J. WEIR

Gardening for many people is a hobby; for some it is a relaxation; for many it is just work — and often hard work! When does gardening as a hobby change to gardening as work? Gardening is work when it is used for making a living and when it prevents the homeowner from doing something else that he prefers to do. Many homeowners enjoy a few games of golf during the summertime; others would like to go fishing, but feel they cannot because there are too many gardening chores. Efficient planning beforehand, in most cases, will change gardening as work into gardening as a hobby.

One method to ensure more leisure time is to plan the grounds so that minimum maintenance is required. This can be accomplished by arranging for the garden plan to be as simple and as uncomplicated as possible. It must be emphasized that on all home grounds there are jobs which have to be done, such as snow removal from walks and driveways, grass to be cut, fences to be painted, weeds controlled, garden furniture kept in a good state of repair, etc. Anything in the form of a better and longer lasting kind of paint for fences and garden furniture, arrangement for walks and driveways to be reasonably straight for hosing down or snow removal, will help.

In order to simplify grass cutting, sidewalks and patio blocks should be installed in the ground at a depth that will allow the lawn mower to move over them when the grass is being cut. When concrete blocks for walks are above the turf level, trimming with shears afterwards becomes necessary. For patios many people prefer to have a solid surface with no space left between blocks for grass or weeds. For a larger area, however, grass or other form of low ground cover relieves the monotony of a solid expanse of concrete.

If shrubs can be located in clumps or fitted as naturally as possible into the border along the edge of the property, there is much less work required in trimming the grass around them. Flowers, both annual and perennial, if placed in front of the shrubs or shrub border will also eliminate much grass trimming.

Many gardeners have grown up with the idea that a trimmed hedge is a necessity on home grounds although they realize, at the same time, that plantings on the ground are made to make the house surroundings look more natural. Hedges need not to be trimmed if care is taken in planning the area to be planted, and the right plant material selected. In most cases, several shrubs of different species planted as a group will be more satisfactory for providing privacy or protection from wind. If it is felt that a full hedge is required the home owner should select, from the many varieties of plants now available, one which is of suitable height but which does not require trimming every

year, or several times a year, in order to keep it at the desired height. Trimming of hedges is a waste of time and, if the hedge is a blossoming type, usually a waste of blossoms.

Weeds create problems in all yards and control is necessary either in the chemical or mechanical form. However, if the homeowner wishes to save time, he can do something about it by ensuring that the soil is well cultivated before planting to get rid of most of the weeds. To control weeds in the lawn, the best time for spraying is a warm sunny day when the temperature is around 70 degrees F., when there is little wind, and before any bedding plants are set out. Spraying at this time is more effective as the weeds are more succulent. It is important that it be done before bedding plants are set out, in order to eliminate drift damage to them. A second spraying for weeds in lawns may be done two to three weeks later, but at this time it is imperative that a particularly calm day be chosen to avoid drift damage to bedding and other susceptible plants. In addition to chemical control, the bedding plants can be planted more closely together so that weeds will not have room to grow. If the occasional weed does appear, it is easily pulled out.

One of the best ways to cut down on garden work and still maintain an attractive garden, is to ensure that the plants to be used are hardy for the area and provide interest over a long part of the season. This is more important for gardens in the prairies than for other areas because of our long cold season when so many of our plants are dormant. The Canadian prairie gardens are famous for the wealth of colors provided by annual flowers. The longer days of sunshine and relatively cool nights provide optimum conditions for high intensity of flower color and healthy plants. However, more emphasis should be placed on the selection of plant material which will provide interest over the other ten months of the year. By careful selection of plant materials, considering such things as color of the bark, bloom, shape and color of foliage, twig color, fruit, branch structure, etc., the grounds will have points of interest and attraction at any time of the year. If trees and shrubs have been planted to extend the attractiveness of a garden over a longer period, fewer bedding plants are required, and thus the amount of work necessary each year is cut down to a considerable degree. In addition, hardy species of trees, shrubs and perennials are not as likely to be damaged by late spring frosts. In some cases annual plantings may need to be repeated, depending on the extent of frost or cutworm damage.

Providing trees and shrubs and perennial flowers for spring, fall, and winter interest does not mean that annual flowers should be neglected. These flowers are still required to provide color and beauty during the summer when many of our shrubs and trees, except those with fall color, are past their more attractive stage.

It must be emphasized that although the initial cost of planting the necessary permanent material is higher, this practice is cheaper over the years and particularly so if one considers the difference in time required for an initial planting compared to the time required for planting up the area every year to bedding plants.

It must follow then that extra time devoted to proper planning of the home grounds and selection of satisfactory plant material pays off in allowing more time for enjoyment and relaxation of the family members, and also allows extra time for the enjoyment of other hobbies. It has been said that we will never forget how to walk as we will always have to get from the house to the garage. There are always some chores to do, so having a garden which requires a minimum maintenance does not mean that the owner will forget how to garden.

Merion Bluegrass — an Assessment

M. R. KILCHER

In the early 1950's when Merion bluegrass first became available in Western Canada, with a price tag in excess of $4.00 per pound, it most assuredly put its best foot forward. It gained universal acclaim as the best turf grass very quickly. Seemingly, it had nearly everything in its favor, including color, density, sponginess, ease of mowing, and freedom from weeds. The fact that Merion lawns greened up a few days later than other lawns seemed a small price to pay for what you knew would be the envy of the neighborhood for the remainder of the season.

Merion bluegrass has that rich look. The grass blades are coarser than other bluegrass or fescue lawn grasses but they are numerous, soft and upright. The grass is not unlike a good quality pile rug with its enviable underfoot sponginess and its built-in resilience. A good Merion lawn grows so tightly that weeds do not have much of a chance, except along the edges of the lawn.

With all of these acknowledged virtues, it would appear that the "defence might rest" with smug confidence. However, we should be fair enough to also acknowledge the "other side of the coin".

Merion bluegrass, to display all of the above qualities, requires more water and a higher level of fertilization than other lawn grasses. And why shouldn't it? There are more tillers to feed and water than in other turf grasses. Be that as it may, the grass automatically requires a greater degree of management and care if its superiority is to be maintained.

Now that Merion has been around for a dozen years other characteristics are becoming increasingly evident. Its extremely thick rhizomatic vigor causes that rapid buildup of thatch. Advantages of thick thatch include sponginess, water-holding capacity, and complete soil protection. But conversely, the disease element has increased rather markedly. From the start it was recognized that common diseases like powdery mildew and certain races of rust were more prevalent on Merion than on other turf grasses. More recently a host of other pathogenic organisms have discovered that the thatch of Merion bluegrass makes a good domicile.

Fairy ring and its associated "mushrooms" occur much more frequently in Merion bluegrass than in other lawn grasses. Within the last three seasons in particular, other pathogens have moved in to fade-out and yellow-off areas within some Merion lawns. Along with increased snow mold damage and post-winter injury, some Merion lawns look pretty ragged during the growing season. Of course not all keepers of this turf have had equivalent misfortune, but most badly injured lawns have been Merion bluegrass.

Pathological identification and resulting recommendations for treatment have been rather vague to say the least. It probably is possible to grow and maintain a good Merion lawn still, but one must be prepared to intensify the management, and adopt a stepped-up disease control practice.

With considerable reluctance and mixed feelings, we in Saskatchewan have had to remove Merion bluegrass from that highly recommended status to which it once belonged.

"The Farmstead Improvement Program In The Yorkton Agricultural Representative District"

P. W. PETERSEN

During the past six years there has been a very substantial increase in the number of requests from farm people in my district wishing assistance with some aspect of farmstead improvement. When speaking of farmstead improvement we do so in the broadest sense, and include shelterbelts, farm home landscaping, farmstead cleanup, relocation of farmsteads, re-arrangement of existing buildings and facilities, location and design of new buildings and facilities, driveways, as well as installation of the farm water and sewerage systems. In other words, almost everything associated with the physical aspect of the farm yard area must in my opinion be part of an overall farmstead improvement program.

You may wonder why the number of requests for farmstead improvement have been increasing fairly rapidly since the early 1960's. After all farmstead improvement is not something new because farm people have been improving their farms since the earliest days of settlement. I think there are a number of specific and perhaps rather obvious reasons. Firstly, many farm families, particularly since 1960, have built new homes, most of which are comparable to homes in our larger urban centres. This in turn has created a strong desire in farm families to make their farm home grounds as attractive as those of their counterparts in the city. Almost all the new farm homes now being built in our district have a modern water and sewerage system installed. The technical assistance for this latter program is provided by our Family Farm Improvement Branch, through their local technician with whom we work closely. This water and sewage program has perhaps done more than anything else to close the gap between rural and urban living; and in addition, it has made possible the same kind of gardening and landscaping activities enjoyed by urban dwellers. For example, having water under pressure offers numerous advantages, such as starting and growing lawns, flowers, ornamentals to name only a few. Relocation of farmsteads is another factor that has created a need for such specific aspects of farmstead improvement as shelterbelts, general landscaping assistance, and building layout arrangement. For example, we have several farmers who have developed a completely new site for their farmstead, based on a prepared plan. The severe drought of 1961 which caused much of our native shelter and many of the older established shelterbelts to die out, has created a need for shelterbelt replacement. The availability of power equipment such as roto-tillers, power mowers, hedge trimmers, etc., which has taken much of the hard work out of maintaining the various plantings associated with landscaping, has also been an important contributing factor. One other factor which has no doubt accelerated the program in our district is that we have given this program considerable priority, since we feel it is very

important. While there are no doubt many other reasons, I feel these have been the most significant in our district.

Almost all of the assistance we provide comes as a result of specific requests from individual farm families. We feel that following such a request irrespective of what area of farmstead improvement is involved, a visit to the farm is a "must". Our experience has indicated that it is extremely difficult to plan any aspect of a farmstead improvement program, except perhaps a shelterbelt design, without first viewing the overall farmstead layout. This initial farm visit also provides an opportunity to discuss the long term plans for the farm, as well as the wishes, desires and likes and dislikes of the farm family.

The majority of requests for farmstead improvement are in the specific area of farmstead landscaping, primarily, of course, the farm home grounds. I include in this the shelterbelt which in my opinion, is essential for any good landscape plan.

As pointed out we arrange a visit to the farm after a specific request has been received. On the first visit a visual observation is made of the overall farm layout, planting preparations that have been made, and perhaps most important we try to obtain some indication of the farm family's landscaping ambitions. For example we find some families where the husband and wife are both keenly interested and seem to be blessed with the proverbial "green thumb". In such situations a more elaborate and extensive landscape plan might be suggested. On the other hand, there are situations where perhaps only the wife or husband is interested, hence the landscape plan should be less ambitious. Degree of mechanization and available time are also other considerations. It has been my experience that most farm families tend to be somewhat over-ambitious in their landscaping desires, perhaps not fully realizing that labor conflicts with other farming operations are an important consideration.

Either during or after the initial farm visit a farmstead landscape plan is prepared on a large sheet. This permits drawing the plan to scale which is very desirable. In some instances we request the farmer to first prepare a rough plan showing the various distances of the area to be planted, location of exisiting physical facilities, shelterbelts and so on. Having the farm family prepare a rough draft is not always easy, however, it makes them take a critical look at their own farmstead which would not be the case if we did everything. In addition, it reduces considerably the work we must do when preparing a plan. I feel also that this approach represents an expression of sincerity, and indicates to us that the farmer is serious about improving his farmstead.

If the farm home area is small and a simple landscape plan is desirable, we usually prepare this at the farm in consultation with the farm family. We find that many have had little experience with planting material so that they rely rather heavily on our suggestions. In this regard we have prepared a binder containing colored plates of some of the most common hardy trees, shrubs, ornamentals and flowers. We are also preparing a set of 2" x 2" slides of the various planting materials. The value of this is obvious when it comes to discussing planting material with the farm family.

We try to emphasize that most plans are designed for completion over a two to five year period. In addition, we point out that each plan is intended as a suggested landscaping plan only, and that the farm family can make whatever changes they wish.

I feel that a plan is perhaps the most important part of any farmstead landscaping program. It is like a crossword puzzle with every specimen

fitting in its place to make up the final and completed plan.

I would like to acknowledge the tremendous amount of help and assistance received from Stan Sheard, our Provincial Horticulturist. Each year we try to have Mr. Sheard in our district for a few days to assist in drawing up some of the more elaborate plans, visiting farms that have completed or partially completed their landscaping program, as well as discussing horticultural problems relating to farmstead improvement generally, and landscaping specifically.

Perhaps most encouraging has been the way in which these farm families are proceeding with their plans. Some are now completed, while others are nearing completion, and of course, there are some just starting.

Encouraging too has been the way the plantings are being cared for. I feel that periodic farm visits and a few words of commendation are most beneficial in this regard.

One area we have said very little about is the shelterbelt. As I have stated the shelterbelt is in my opinion the foundation of a good farmstead improvement plan, and particularly the landscape plan for the farm home. Perhaps our biggest problem here is to convince farmers to plant their shelterbelt out far enough to permit future expansion within the farmstead. The types of trees, number of rows and spacing of trees, varies from farm to farm, and depends on such factors as natural tree growth, soil type, size of area to be planted, equipment available, and how fast shelter is desired. We try to avoid a sterotype approach. There are, however, several rather basic things which we try to emphasize rather strongly to farmers planting a new shelterbelt. Firstly, the need to keep the trees well cultivated and weed-free during at least the first three years. Secondly the importance of having a permanently cultivated strip on the outside and inside of the shelterbelt. This tends to act as a water trap so we don't lose some of our trees, particularly poplar, willow and spruce during years of extreme drought. In addition, it prevents grass and weed growth moving in and consequently lessens the danger of fire getting into the shelterbelt. Thirdly, we always suggest one or two rows of evergreens, preferably colorado spruce, for the inside row since they not only provide excellent shelter, but also add decor to the landscape.

In conclusion, I might indicate some of our future plans relative to our farmstead improvement program. Firstly, it is our desire to continue to provide on-the-farm assitance on the basis of specific requests, and within the limitation of time available. Secondly, starting in 1969, we hope to arrange a tour(s) of local people to some of the farms which have their landscape and/or farmstead plans completed. We intend also to use individual farms for conducting field days from time to time. This approach should provide some practical information on landscaping, and generally assist farm people in recognizing some of the principles involved, as well as the various species of trees, shrubs, ornamentals, flowers, grasses which are available. Hopefully this will permit quite a few farm families to develop their own farmstead landscaping plans.

I would like to emphasize that we are not by any stretch of the imagination professional landscape architects. Our present program started from a very humble beginning, and perhaps because we have given it considerable priority it has expanded considerably. We simply try in our own humble way to share our experiences in this field with the farm people whom we serve, in the hope that our efforts will make some contribution to improving their social well-being, and at the same time provide some much needed beautification to our rural scene.

Dwarf Evergreens For The Prairie Garden

GEORGE KRAHN

It appears that dwarf evergreens are becoming firmly established on the grounds of prairie homes. For many years there seemed to be a lack of knowledge as to what varieties would perform best in our cold climate, but during the past dozen years or more, many clones of different kinds and species have been tried and grown successfully, so that new varieties that will survive our cold winters and thrive satisfactorily can be recommended with reasonable confidence.

There are many dwarf evergreens available. The homeowner, however, is to be cautioned against buying without first selecting only the hardiest available. If uncertain, contact the local nurseryman or officials of your nearest experimental farm, university or local agricultural office for advice as to the varieties that are dependable in your locality.

Dwarf evergreens have many uses and are used extensively for foundation planting around buildings, for tying down steep banks, for rock gardens, low hedges, or as ground covers by mass planting such plants as junipers or even Mugho pine. If, at any time, they grow beyond the bounds of a particular area, their naturally restrained growth can be further controlled by selective pruning or perhaps even shearing, as would be the case with hedges.

When growing evergreens near foundations of buildings, it must be borne in mind that the moisture loss of the plants is greater under such conditions than when they are grown away from the building. This is particularly true when grown in a south-eastern or western exposure. In these locations, be liberal with your watering throughout the summer, and even more so in October when the plants are preparing for winter.

The American arborvitae (white cedar) — *Thuja occidentalis* — provides us with many choice forms most suitable for various locations around the home grounds. In the early life of these plants they may occasionally suffer from winter sun-scald if unprotected from the south-west sun and wind during the late winter months, but recovery is usually fast. While some of the selections will grow 10 to 25 feet high, they are readily controlled downward, and can be shaped by judicious pruning. Thus, they are kept neat and attractive.

'Brandon pyramidal' is probably the most outstanding selection for our region. It will grow 20 to 25 feet high with a spread of about five feet. Foliage is bright green, dense and compact. This variety is ideal for foundation and accent planting, and excellent for hedges where it will require little or no pruning.

'Wares' or 'Robusta' is a cedar attaining a height of 8 to 10 feet with a width of 10 feet. In its early growing stage it has a tendency to be globe-shaped. If an upright form is desired, early pruning should be practised. The leaves are dark, dull green. It is quite popular on the prairies and is quite hardy.

'Holmstruppi', a more recent introduction, is a very slow, upright-growing form, extremely dense in habit and dark green in color. Outstanding in appearance, it has done well with us during the past 6 to 7 years. Rosenthali,

Nigra, and Lutea are other upright selections that have proved to be successful. The latter one has golden colored foliage. Of particular interest in recent years have been plants grown from seeds of the 'Brandon pyramidal'. Perhaps further selections can be made from these. 'Globosa' develops into a dense compact natural globe form with dark green leaves. It is used effectively for foundation and formal planting where a dwarf form is desired. The outstanding selections which have proved to be dependable in our area are Woodward, Little Champion and Little Gem.

The Rocky Mountain juniper, *Juniperus scopulorum,* is the species juniper to look to for providing us with a greater variety of hardy dward evergreens suitable for prairie home grounds. These junipers are native from the Dakotas westward to the Rocky Mountains. Here, in their natural environment, they grow under extremely adverse conditions and hence are ideally suited for our area where similar climatic conditions prevail. They are very drought resistant and will tolerate dry sandy locations. When grown from seed, these junipers vary considerably in size and shape. In most cases, they are somewhat coarse and loose in structure; grey-green in color and reach a height of 10 to 20 feet, but occasionally higher. However, selections have been made, and these are most valuable landscape material. The following are some of the better known forms for our regions:

'Grizzly Bear' was originated by R. H. Patmore, Brandon, Manitoba, and is one of the most attractive, upright growing junipers available on the prairies. It is a dense, broad pyramid, requires little or no pruning. The "cedar-apple" fungus does not seem to affect it. Blue-green in color.

'Silver Globe' is somewhat open in habit. A natural globe form; intense blue in color. The form of this one will be improved if the tips are pinched back.

'Blue Heaven' is steel-blue in color; narrow, columnar type of growth; fast growing. This selection may sun-scald occasionally but it recovers quickly. In the trade, it has been erroneously listed as Blue Haven. Plants in Saskatoon on the south side of a residence are doing well and are now 5 to 6 feet high.

'Springbank' is intense blue in color, loose open habit of growth. For compactness it should be sheared so that it will become very dense. Very fast growing. Outstanding.

'Skyrocket' is new here and not too well known. Very narrow, fastigiate type. Until recently, it was thought to be a selection of the eastern red cedar — *Juniperus virginiana* — which is not hardy here.

'Medora' is a new, most attractive upright-growing columnar type; blue-grey in color. It is not too well known in the prairies and its hardiness not yet fully established. However, at the Morden research station it is performing very well. Being a clone of the Rocky Mountain juniper, one might well conclude that it will be hardy throughout the prairies.

Creeping Juniper — *Juniperus horizontalis* — is a low-growing native species well adapted to dry sandy locations and is useful as a ground cover, for rock gardens, steep banks, etc. A variety of selections are available which are mostly procumbent although some may reach 12 to 15 inches in height, and a few even taller. In color, they range from deep green to steel-blue. All take on the natural purple shades at the approach of winter.

'Andorra' has plume-like branches, dark green in color. It grows 12 to 15 inches high into a thick mat. 'Compacta' is a selection that will grow to 30 inches with a 4 foot spread.

'Wapiti' is fast growing, also to 15 inches high. It has dark green foliage

and a feathery type of growth. From the Beaverlodge Experimental Station.

'Dunvegan Blue' is deep blue, has a trailing habit of growth, but also forms thick mats. This originated in northern Alberta and was introduced by John Wallace of Beaverlodge Nursery.

'Bar Harbour', 'Waukegan', and 'Blue Rug' (Wiltoni) are selections similar in habit to Dunvegan Blue. All develop into dense, blue carpet-like ground covers.

'Prince of Wales' is yet another in this class and perhaps the latest to be introduced into our area. This selection forms a dense, dark green mat, almost a foot high. Very attractive plume-like tips. Most outstanding. Originated at the Morden Research Station.

The Savin Juniper — *Juniperus sabina* — is another species that has produced many dwarf variations, a number of which are quite reliable for the prairies. The Savin Juniper grows to 3 feet high and up, with a spread of up to 10 feet. The leaves are dark green and borne on arching branches. The plants are suitable for foundation planting, although they have a tendency to sun-scald when planted on the south or west side of the house without protection.

'Arcadia', a clone of the foregoing is similar in habit of growth but will only attain a height of 2½ feet. Color is light green with arching branches. It has not been known to sun-scald in the prairie regions. Outstanding.

'Skandia' is another very worthwhile clone to grow. It, like Arcadia, is not subject to sun-scald. The foliage is fine-textured, dense, blue-green in color. Maximum height is 18 inches. A very suitable plant for foundation plantings. Tamarix Juniper — *J. tamariscifolia* — is a variety somewhat similar to Skandia, although it has a greater tendency to hug the ground. Height of it is about 18 inches, but it is not too common on the prairies.

In the Chinese Juniper group — *Juniperus chinensis* — there is only one form that appears to be reasonably hardy in our area which is the Golden Pfitzer — *Juniperus chinensis pfitzeriana aurea.* In the ten years that we have had it, it has suffered sun-scald only a few times, and recovery during the following summer was rapid. It has fine-textured dense foliage with golden-tipped branches. It is slow-growing, to a 24 inch height, and should be planted in full sun to bring out the golden color of the tips.

The Swiss Mountain Pine — *Pinus mugo* — is a large, round-headed shrub 8 to 12 feet high that grows with a multiple number of stems from the base. A good background plant in large borders. It tolerates dry sandy locations and does not thrive too well in shade. This species has produced a number of very choice dwarf types suitable for foundation planting. While all of them can be kept dwarf by shearing when they are in the candle stage of growth, they will quickly grow out of shape when the shearing has been discontinued. Thus, it is desirable to use, where small plants are required, the dwarf forms that are propagated vegetatively, or those occasionally selected from large populations of seedlings which are dwarf in form. Two dwarf selections of the Mugho Pine, 'Compacta' and 'Mughus', are excellent ones for foundation and border plantings. Both of these are propagated vegetatively. They are compact, dense evergreens, 3 to 4 feet high.

A dwarf form of Colorado Spruce — *Picea pungens* — known as 'Montgomery', appears to be reliably hardy in our area. It is compact and has intense blue color. It is quite rare on the prairies. Selections of other species are being tried but, thus far, none have proven to be as dependable. It is quite slow growing, and at 25 years of age trees are still only four feet high!

The pH Factor

Sweet and Sour

N. J. BELL

Would you attempt to grow ferns in an arid, sunny location? No, you would know that this is not the proper environment for growing this plant and that zinnias would be a better choice for this type of location. It is generally understood that for plants to thrive, care must be taken to select the correct environment such as temperature, light, and moisture conditions, for the plant you are attempting to grow.

A factor quite often overlooked is the pH factor of the soil. A soil which is acid in reaction is commonly referred to as a sour soil; a soil that is alkaline is commonly referred to as a sweet soil.

Soil chemists have set up an arbitrary table for the measurement of soil pH conditions. The degree of acidity or alkalinity is expressed by the scale of pH values ranging, in the case of soils that are likely to be cultivated as gardens, from a pH 4 to 8.5. At a pH 7 the soil is said to be neutral and therefore there is neither sweetness nor sourness. All figures lower than pH 7 denote acidity (sourness) and all figures higher than pH 7 denote alkalinity (sweetness).

The pH can be measured by use of indicator paper which is a dry, absorbent paper impregnated with one or more indicators. These are complex organic compounds similar in structure and optical properties to dyes. A pH reading can be made by putting a drop of soil solution on this wide range indicator and by observing the color. The color derived is compared to a corresponding color chart, which indicates the pH reading.

There is probably a best pH value for each plant species but most plants will grow well in soils with fairly wide ranges of pH values. There are exceptions, however. The acid loving plants such as azaleas, blueberries and rhododendrons do best with pH 4 to 5 whereas it would be disastrous to attempt to grow a good crop of clover, beans, or lettuce on such a soil.

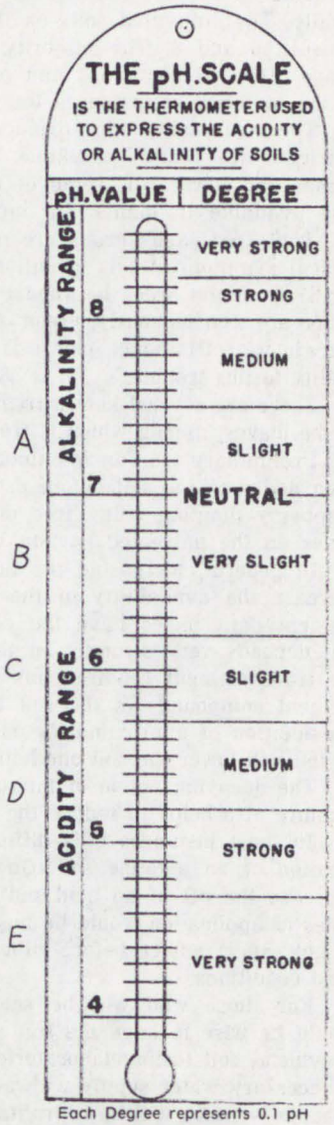
The accompanying chart outlines the pH preference for fruit trees, vegetables and flowers.

PH PREFERENCE FOR FRUIT AND VEGETABLES

A	B	C	D	E
Asparagus	Broccoli	Apples	Parsnips	Blueberries
Beets	Brussels Sprouts	Beans	Potatoes	Cranberries
Cabbage	Cantaloupe	Black Raspberries	Pumpkins	
Carrots	Corn	Currants		
Cauliflower	Cucumbers	Gooseberries		
Celery	Garlic	Peppers		
Lettuce	Leek	Squash		
Onions	Muskmelons	Strawberries		
Pasley	Peas	Tomatoes		
	Radishes	Turnips		
	Raspberries			
	Rhubarb			
	Spinach			
	Watermelons			

PH PREFERENCE FOR FLOWERS

A	B	C	D	E
Babysbreath	African Violet	Amaryllis	Birch	Azalea
Calendula	Ageratum	Begonia	Bouvardia	Calla Lily
Cineraria	Alyssum	Burningbush	Camellia	Holly
Clematis	Anemone	Cyclamen	Coreopsis	Hydrangea, blue
Dogwoods	Aster	Cypress	Ferns	Ladyslipper
Forgetmenots	Bachelorsbuttons	Easter Lily	Fir	Pitcher Plant
Geraniums	Bleedingheart	Euphorbia	Hemlock	Rhododendron
Hibiscus	Candytuft	Gardenia	Jackinthepulpit	Trailing Arbutus
Ivy	Canna	Hydrangea	Jacobsladder	
Mockorange	Carnation	Japanese Iris	Laurel	
Morninglory	Chrysanthemum	Lily	Orchid	
Nasturtium	Clarkia	Lupine	Pine	
Petunia	Columbine	Phlox		
Poinsettia	Cosmos	Primrose		
Poppy	Coxcomb	Water Lily		
Sweet Peas	Crocus			
Sweet William	Daffodil			
	Dahlia			
	Daisy			
	Foxglove			
	Fuchsia			
	Gladiolus			
	Goldenrod			
	Hollyhock			
	Hyacinth			
	Iris			
	Ladyslipper, Showy			
	Larkspur			
	Lilac			
	Marigold			
	Narcissus			
	Pansy			
	Peony			
	Primula			
	Pyrethium			
	Rose			
	Salpiglossis			
	Scabiosa			
	Snapdragon			
	Spirea			
	Stocks			
	Tulips			
	Verbena			
	Violet			
	Zinnia			



The pH Scale.

Each pH unit measures intensity of acidity or alkalinity. Each unit as measured from the pH7 or neutral point, increases by ten-fold in intensity. For example at pH6 the intensity of acidity is 10, at pH 5, the intensity as compared with pH7 is 10 x 10 or 100 and so on. The same applies to units above pH7 in measuring alkaline intensity. You can see the difference from the regular thermometer scale where each degree measures an equal quantity of heat or cold.

Growing Plants Under Field Conditions

Acid soils are common in areas of high rainfall and where forests form the native vegetation. These soils are acid because calcium, magnesium and other cations are gradually replaced from the soil colloids and removed from the soil by leaching. Porous, sandy soils which let water percolate readily through, unfortunately carry away soluble materials and these are often acid. The replacing ion is chiefly hydrogen of carbonic acid and other acids from decomposing organic matter. Therefore, the resultant soil is acid in reaction.

Under western prairie conditions of lower rainfall, higher pH values are encountered because the soluble carbonates have not been leached out of the profile. The cultivated soils on the prairies, with few exceptions, have a pH between 6 and 8. The majority of the soils fall within the 6.5 to 7.5 pH range. Most of our crops and plants prefer a pH between 6 and 7 so that in the majority of instances the pH of our soils is quite favorable.

The availability of nutrients in the soil is also related to pH. Most nutrients are readily available between a pH range of 6.5 - 7.0 but at a higher and lower pH, some of the essential elements are likely to become less available to plants. On high lime soils in Manitoba having a pH of 7.5, fruit trees and shrubs are often affected by lime-induced chlorosis. The typical symptom of this condition is the gradual loss of green color (chlorophyll) from the areas between the veins of the leaf, with the result that the veins are conspicuously green against a yellow-green background. Not all calcareous soils induce chlorosis and crops differ markedly in their susceptibility to this trouble.

There are several known treatments to correct the low soluble iron content in the leaves, among which is treatment with iron chelates.

Preliminary tests in Manitoba where sulphur as a preplant treatment has been added to the soil before establishing raspberry canes, has resulted in a raspberry planting being free of chlorosis after several years, whereas the canes on the untreated portion became chlorotic.

In general, increasing the acidity of a high pH soil by any means will increase the availability of the trace elements except molybdenum. Trace element deficiencies have the characteristic that their severity on a given soil depends very strongly on the season. Hence, either the climate affects the trace element requirements of the crop or the availability of the trace element compounds in the soil to the plant. It is generally considered that the addition of approximately one to two lbs. of sulphur per 100 square feet of soil will lower the soil one half pH.

The decaying action of micro-organisms on organic matter such as green manure also helps to reduce the soil pH.

In most instances it is difficult and impractical to accomplish the acidification of an alkaline soil. On the other hand it is considerably easier to increase the pH of an acid soil by the application of ground limestone. The rates of application would be based on a soil test. In each case it is advisable to get expert advice before either attempting to raise or lower soil pH under field conditions.

For those who will be selecting soil for a commercial enterprise, it would be wise to have the soil adequately tested and analysed at one of the provincial soil testing laboratories. The selection of the proper soil, including a necessary water supply with adequate shelter, will go a long way to assure that the venture will be a profitable one.

Growing Plants with Prepared Soil Mixtures

When growing plants indoors there is less soil being utilized, and by preparing the proper soil mixtures the pH factor can be controlled.

Potted plants vary in their soil requirements. Some, such as geraniums, grow best in a rather heavy clay loam; others, such as cacti, need an open, sandy soil preferably with the addition of lime. Some plants cannot thrive unless the mixture consists largely of decayed organic matter, which must have an acid reaction for certain types and be neutral for others.

The grower of house plants should follow the advice of the professional grower of pot plants and keep on hand the various ingredients which can be combined to make the right kinds of soil for different plants and purposes. Specific information on the soil requirements of each plant can be procured from books at your local library.

A general mixture for seed sowing and growing potted cuttings is to use equal parts of loam, leafmould and sand. Pass the ingredients through a half inch sieve and mix thoroughly. When making up these mixtures the proportions can be slightly changed, keeping in mind the variability of the ingredients in different sections of the country. For instance, if the loam is sandy, reduce the proportion of sand; if the loam is of a claey nature, increase the proportion of sand so that a handful of the moist mixture when squeezed into a ball readily falls apart when pressure is released. The above soil mixture should fall in the pH range 6-7.

For plants requiring a soil rich in humus but not especially acid, such as African Violets, Begonia or Gloxinia, double the amount of the leafmould.

For acid soil plants such as Azaleas and Gardenias which thrive in a soil of pH 4.5, substitute an acid peat moss for leafmould and double the amount. A suitable soil mixture for acid soil plants would be the following: 4 parts loam, 3 parts sand, 3 parts peat moss, 1 part leafmould, 1 part thoroughly rotted manure.

The addition of chemical fertilizers should be used with care to prevent burning. When fertilizing acid soil plants, the nitrogen carrier should be acid, e.g. sulphate of ammonia 21-0-0 rather than ammonium nitrate.

When fertilizing Azaleas and Rhododendrons, it is better to use a 50-50 mixture of well-rotted manure and acid peat moss to supply the required nitrogen, and a level teaspoon of cottonseed meal in a six inch pot to supply needed phosphorous. In this way the acidity level of the soil will not be altered.

For sweet soil plants (pH 6.0 - 7.5) such as Chrysanthemums, Fuchsias and Geraniums when the soil which is being utilized is acid in reaction, bonemeal should be added. The lime carbonate content of the bonemeal will increase the soil pH and at the same time will serve as a slowly released phosphate source. A suitable potting mixture for sweet soil plants will be 4 parts loam, 2 parts sand, 3 parts sieved leafmould plus half a cup of bonemeal to each peck of mixture.

Wherever plants are grown it is important to consider the sweetness or sourness of the soil. Even though some plants will thrive under a fairly wide pH range, there are other plants which are particular in their growth habits and will only do well at a specific pH reading.

The pH is just one of the many factors to contend with in order to earn the distinction of being a grower with a "green thumb". It is this careful attention given to all facets of plant growth, including soil pH, which will determine whether your efforts turn out sweet or sour.

You Too Can Enjoy Fuchsias

W. H. HAWKINS

The main point in growing fuchsias, as in any other type of plant or with animals, is to try to duplicate conditions that exist in the natural habitat.

In the prairie and foothills areas partial shade is a must and protection from strong winds helps a lot. With suitable soil and proper moisture conditions, protection from insect enemies, pinching to shape the plant to your desired form, and a regular fertilizing program, the result will be many gorgeous blooms.

Partial shade can be obtained by placing your plants in the filtered light of trees. You can build a lath shelter, running your laths north and south. The laths should be approximately one inch wide and the spaces between about the same. A shelter with fibre glass or plastic panels, or tinted glass, makes a good set-up. If you have a set of plank shelves, like wide steps, to set your pots on, you're well away.

A suitable soil would be equal parts of sand, rich loam, peat moss and well rotted leaf mould. Your soil must drain well but must never get real dry — water until the moisture runs through and don't water again until the surface is dry.

Fuchsias have several enemies such as white fly, aphids, mealy bugs and mites; but there are products available to combat all these. The secret here is not to wait until you get an infestation — start early and have a regular spray schedule.

If your plants are grown in a position where, with a fog nozzle on your hose, you can give them a good shower on the underside of the foliage as well as from above two or three times a week, your insect danger will be greatly lessened. Do this spraying in the evening when the sun is obscured. As well as curbing the influx of insects, this spraying will be a real boon to your plants, especially after a hot dry day.

Start in the spring by obtaining named varieties and know whether they are trailing types, uprights or dual purpose; and then grow them to the shape you desire by pinching the new growth.

A standard (upright) is grown by not pinching out the leader until the plant has attained the height you want. Pinch out all the side branches as they form and, finally, when the plant is the desired height, pinch out the leader. From then on you pinch out every second pair of leaves until you get a nice full head of growth. Remember the oftener you pinch, the more branches you get, and consequently the more bloom.

Staking during this stage is a must; in fact, it may be three or four years or more before the trunk will be strong enough to support a full head of growth.

In growing a bush shape you start your pinching early and pinch to get the shape you want. When you pinch off the growing tip, two new branches grow from there. When these in turn are pinched, after growing two pairs of leaves, they again each grow two new branches. The shaping of the bush is simply a matter of taste.

For a trailer you must start early with the pinching procedure, and keep pinching every second pair of leaves until you have a good number of branches by the time the tips reach the edge of the basket. A better, fuller basket will be obtained by planting about three plants in a 12 by 12 inch basket.

Pot all your rooted cuttings in small pots and re-pot into progressively larger pots before they become root bound.

Much has been written about the fertilizer for fuchsias. Some advise the use of a high nitrogen fertilizer in the spring with a switch to much less nitrogen when the blooming starts. I see nothing wrong with a steady use of 12-31-14 during the growing season.

Before a killing frost, in the fall, partially prune your plants. Strip off all the leaves and put your plants to rest in these pots in a cool dark corner of your basement or root cellar, as cool as possible but above freezing. Give them a slight bit of water every week or two and mist the branches with water. They will survive until spring when they should be re-potted into fresh soil. Prune the long ropey roots back and severely prune the branches. New growth will soon begin and another season's bloom isn't far away. Cuttings of new growth root easily in a sterile medium or plain water.

New varieties are being introduced each year but you won't go far wrong if you use Tiffany, Pink Galore, Cascade, First Love and Rambling Rose for hanging baskets. For uprights use Voodoo, Satellite, Bountiful, Carmel Blue, Dusky Rose and Georgana.

A perennial favorite is Ballet Girl or Swingtime for both basket and upright growth.

These Men Enriched Prairie Life

Harry A. Graves 1903-1968

Upon his retirement a year ago, after a generation of years of service as North Dakota State Horticulturist, these pages extended regards and wishes for years of happiness. Unfortunately it was all too short for already the time has come to bid our friend and associate farewell.

Editor E. M. Hunt in the Minnesota Horticulturist, October 1968, spoke for all of us:

"The horticultural world of the northern plains — the Canadian prairies as well as the Dakotas and Minnesota, suffered a real loss when Harry Graves died recently. . . . .

"The friends he made throughout the area are legion. They are not all in horticulture — they came from all walks of life. He cared about horticulture and he cared about people, giving of himself in a kind of help and friendship that is rare. He will be sadly missed."

Milton John Tinline (Oct. 14, 1880 - Oct. 31, 1968)

Came from Aurora, Ontario as a lad and spent the rest of his busy life on the prairies. After graduating in the first class to receive degrees from the Manitoba Agricultural College, 1911, he joined the Canadian Experimental Farms system. He went to Brandon 1912, leaving in 1914 to become superintendent at Scott. He returned to Brandon as superintendent in 1924 and filled that important office until retirement in 1946.

The following year he embraced the challenge to take over the management of the huge International Peace Garden. During the ten years he was superintendent, 1947-1957, a great deal of development took place. He was tireless in guiding groups of visitors and in addressing meetings with his display of inspiring color slides.

His effective works were recognized by the Manitoba Horticultural Association, making him an Honorary Life Member, and in 1962 by the Manitoba Golden Boys bestowing upon him their "Good Citizenship Award".

The people privileged to dwell upon the sunny, fertile prairie plains will continue to feel a glow of warm friendship every time, and that will be often, the name Milt Tinline is mentioned. He was long in good works.

Edgar Spinney Archibald, B.A., B.S.A., LL.D., LD.Sc., C.B.E.

May 12, 1885 - January 24, 1968

A native of Yarmouth, Nova Scotia, this man blessed with an astonishing number of talents, all of which he seemed to keep keen with use, belonged to all of Canada. Although his headquarters was Ottawa, he had a fondness for the prairies. He was proud of the successes of prairie experimental farms and when he planted his three-acre summer home at Sandy Cove, near Digby he specialized in Rescue applecrabs from Scott; and apricots, plums, apples, cherries, roses, lythrums, shrubs, tomatoes, corn, peppers, cucumbers and cabbages from Morden; and melons from Indian Head. He reported that his estate was known among fellow Nova Scotians as 'The Morden Experimental Station'.

His life was full. His honors numerous, including that of Fellow of the Royal Society of Canada, Fellow of the Agricultural Institute of Canada, and Commander of the Order of the British Empire.

During his tenure of the Directorship of Experimental Farms branch, 1919-1950, the farms grew from 16 to 53. He had much to do in masterminding the birth and growth of P.F.R.A.; established processing laboratories at Morden and Lethbridge; increased acreage devoted to prairie horticulture; and arranged the formation of the Western Canada Society for Horticulture, an organization that has brought untold benefits to the great plains. When the Forestry Branch decided to disband the two Forest Nursery Stations, he stepped in and adopted them into the Experimental Farms system. We are indebted to him eternally. Dr. E. S. Archibald, — brilliant, powerful, resolute Canadian; enthusiastic supporter of prairie horticulture!

How About A Friendship Garden?

FRED RICE

Many of us have been introduced to new plants by thoughtful friends over the years with gifts of slips, roots, seeds, plants and bulbs. These often develop into specialties and prized possessions.

Would it not be a nice idea if there is a special corner of YOUR garden to establish a collection of your friends' floral gifts. Label each one with your friend's name and date of gift. You'll have living examples of friendship growing with the years.

This idea could also work in reverse by making gifts of the more or less exotic or unusual types of plant material to your gardening friends with the suggestion for the starting of a Friendship Garden.

Tuberous Begonias

J. R. ALMEY

Our Fort Rouge garden of begonias is in a heavily treed area. Several large oaks, as well as the boulevard elms, prevent us from using flowering plants that need open sunny locations. An eastern exposure provides sufficient sun in the early morning to give good color and sturdy plants. Without some sun and generous air currents the begonia plants would become drawn and subject to mildew.

Begonias are recommended for shady locations, however this does not mean they will not give good results in hot sunny locations. A friend of mine grows marvellous begonias on a western exposure in the arid Okanagan Valley of British Columbia. True, he takes the necessary precautions to supply constant moisture — but, more about that later.

Most of our begonia tubers in Canada are supplied by Belgium. A few originate in California. Seed houses and stores offer them for sale in early spring.

Varieties

Camellia flowered type is most commonly grown. Good strains will give close to 90% doubles. They can usually be purchased in separate colors.

Pendula types — These smaller, more numerous flowered kind are excellent for window boxes, planters and hanging baskets. Tubers are usually smaller and are grown in smaller sized pots so as to take less room when planted out.

Starting Growth

Tubers should be taken out of storage near April 15; and will benefit from a soaking in warm water for five to six hours to get them started into growth. Shake the water from the tubers and plunge them into a flat of dampened peat moss. Tubers should be barely covered. Place flat in a warm place in the basement and keep peat moist by light watering when necessary. In three weeks, or possibly more, tubers start into growth, and numerous fine roots should have penetrated the peat moss. When they are two or three inches high, plant in individual 5 inch pots. The peat moss clinging to the tubers should be planted with them and the soil worked in and around the peat.

From then on light and warmth are necessary. A small greenhouse is needed if a large number are to be grown. The number grown will dictate the method of growing, until they are planted out in the garden. A few plants can be grown on the sill of a bright window. While they are still in the flower pots it will be found beneficial to stand them outside, near the place they are to grow, for a few days before planting. This will toughen them without root disturbance, and the shock of unfavourable weather conditions will be less severe. Plant so that the tuber is less than two inches below the soil surface. A plant with good leaf growth about 6 to 8 inches high by June 6 should be the aim of the grower. Until about that date our prairie soils will still be cold and the risk of frost is still with us.

Soil

Soil type and the handling of soil and mulch is very important. It is difficult to grow good begonias in stiff clay soils. They prefer sandy soil containing lots of partly decayed manure, leaf mold or peat. A mixture of the above is necessary for the in-pot stage. Avoid an alkaline soil or one that will not retain moisture. If one knows of a blueberry patch, a few bushels of soil from such a location will form the basis of an excellent soil for begonias. The soil in which they are to be grown outdoors should match the above mixture as nearly as possible. If rainfall is light during July and August, watering is a must so as to keep a uniform supply of moisture.

I mentioned earlier begonia plants being grown in British Columbia. To offset the heat there a mulch of two to three inches of peat moss was used over the top of the soil and around the plants. Water was supplied in sufficient quantity to keep the peat moist and to penetrate to the roots below. The humidity from the peat and its cooling effect in an open situation takes care of the plants' needs.

Summer Care

Careful watering is essential. Staking with thin stakes that stand 9 inches above the ground level will protect the plants against wind injury. While young, the plants break off easily at the tuber. There is little other care needed until frost stops their growth in the fall. Flowering is continuous, and begonias can be depended upon to make a brilliant show of color.

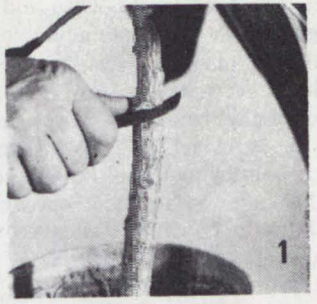
Fall Care and Storage

Refer to Winter Storage of Begonias, etc., W. J. Emerson, page 72.

Don't Let Your Coleus, Fibrous Rooted Begonia, Peperomia And Rubber Plant Become Too Large

HELGE WELLING

Peperomia plants like a well drained soil and can be easily overwatered. They can be propagated by cuttings or divisions. Division simply means breaking a rosette with stem and leaves away from other rosettes with stem and leaves; preferably so that some roots stay with each rosette. If no roots stay with a rosette, put in rooting media and treat as a cutting. When taking cuttings from Peperomia, let the cutting dry for an hour or so to allow the cut end to dry over. Cutting will, possibly, root faster if placed over bottom heat (place plastic bag over radiator or the like). The leaves of the Peperomia do not transpire very fast.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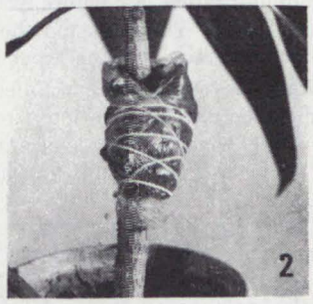
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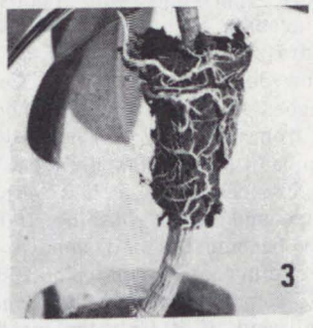
The Rubber plant, Diefenbachia, Draceana, Crotons, Splitleaf Philodendron and like plants can be rejuvenated by airlayering. The materials needed for airlayering are a sharp knife, a couple handfuls of moistened sphagnum moss and an 8 to 10-inch square piece of plastic film (freezer bag cut open will do), twine, plastic ties and some tape. The moss must be **moist** but not wet. Soak it in water for 5-10 minutes and then squeeze out excess water.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Choose an area just below a node (where leaves attach to stem) and remove leaves three-four inches


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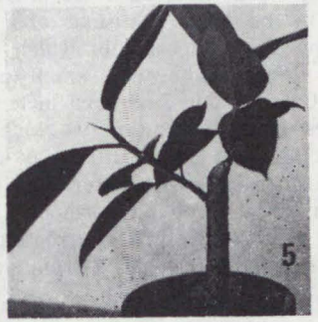
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above and below this point. Then, with a sharp knife make an upward cut 1-1½ inches long and about a quarter way through stem. Don't cut all the way through stem. Brace open with a toothpick or keep the cut open with a few shreds of the moss pushed into wound. If you dust a little rooting hormone into the wound, you will speed the rooting process. Next you cover the wound with a couple of handfuls of moss, forming a football shaped mass around the stem. Hold the moss in place with twine or plastic tie (twist-em); then to keep it moist, wrap it with plastic film and tie quite tightly with twine or twist-em around base, top, and middle of ball in that order. Use tape to seal base and top of ball. If the ball is exposed to strong sunlight, cover with aluminum foil to prevent root scalding.

After a month or two, roots can be seen through the moss. Remove the plastic film but leave moss in place; cut stem through just below the roots and carefully transplant. By using this procedure when the rubber tree is three to four feet tall, a "crown" can be formed on the plant. When the branches grow out too far, these should be cut back closer to the trunk and then allowed to shoot out again. Here again, by cutting the remaining stem back to four-five inches above the soil, new shoots, in most cases, will appear.

Finally, a reminder that the rubber tree is called rubber because the sap contains latex! So before you put it on that new rug for an airlayer, put out papers! You can stop the flow of sap a little sooner with a dusting of ground charcoal on the wound.

What do you do if your Coleus is growing tall and spindly? The fibrous rooted begonia is outgrowing the pot, and you haven't space for a 12 inch pot on the windowsill to accommodate it? Your rubber tree is trying in vain to push the ceiling up another 98 feet, and your Peperomia just doesn't look like it once did.

Whenever your plants are becoming too old, too tall, or otherwise not looking their best, first, find out if you are giving them the right environment, or have you the right plants for the environment in your house. Secondly, rejuvenate your plants through propagation. It is a good idea to rejuvenate plants before they look really bad; in other words, when they are still in good shape.

How do you deal with the Coleus? Pinch it! When your Coleus is about six inches tall, take the top shoot off. When the two branches, which will result from this pinch, grow out, pinch these to make a more bushy plant. Remember though, too frequent attention in this manner results in too many branches and a less attractive plant. The Coleus also likes good drainage and bright sunshine. If these plants do not receive good light, they rapidly become tall and spindly.

To rejuvenate an old plant, simply break the top off approximately five inches from the tip. Cut the remaining stem back to four-five inches above the soil and, if it isn't too woody, new shoots will appear. The top shoot can be used as a cutting and an even better plant will grow from it. Among the many plants which can be started from cuttings are Coleus, fibrous rooted begonia, small philodendrons, geraniums, chrysanthemums, etc. Cut a shoot three-four inches long, just below a set of leaves, remove leaves from the lower two inches of stem. With Peperomia and African violets, take a leaf cutting (a single leaf.) These cuttings can be rooted in moist perlite, peat, turface, sand or similar media. Dip base of the cutting into a rooting hormone (No. 1) and shake off excess powder, then place cutting firmly in the rooting media. Both hormone and media such as perlite can be purchased from your local garden supply store.

I find it simple to use a plastic bag (freezer type) as a propagation "box". Simply fill the bag to a depth of three-four inches with quite moist perlite and insert your cutting into this, with the media firmed around base of stem. Pull the sides of plastic bag up over cutting, leaving top open. Place in good light, but not direct sunshine, and you will find a new root system developing in a few weeks.

The media should be constantly moist but not wet. When good roots are formed, pot into a soil mixture and put the plastic bag inverted over the plant in order to keep up the humidity, then gradually withdraw it, as plant becomes established.

The fibrous rooted begonia can be propagated from cuttings (like the Coleus), or plants like the Rex begonia, the Ironcross begonia, etc. can be started from mature leaves. The veins are cut on the lower surface of the leaf (where the veins cross). Place with underside downwards on sand, or sand and peat moss, in the plastic bag. New plants will start where veins were cut. When these new plants are large enough to handle, they should be planted singly into small pots.

F. L. Skinner Memorial Library

The Manitoba Horticultural Association has decided to set up an F. L. SKINNER, M.B.E., LL.D., F.R.H.S. Memorial Library in his honor. These books will be housed in the University of Manitoba Library and suitably identified. They will be selected by the Staff of the University's Plant Science Division and should serve to remind succeeding generations of horticulturists of Dr. Skinner's great contributions. The Association is attempting to collect $5,000 for this purpose in the next two years. When this goal is realized, only the income from the capital fund will be used for purchase of books so that the fund will be perpetuated.

Donations to the fund should be made out as follows: Canada Trust Company (Skinner Memorial Fund), and mailed to Canada Trust Company, Huron and Erie Bldg., 232 Portage Avenue, Winnipeg 1, Manitoba. Official receipts for Canada Income Tax Exemption will be issued.

Will you help us to honor the memory of this great plant breeder?

Cacti and succulents succeed in shallow planter

LOUISE EDNA PAULS

Venture too close to the prickly fascinating cactus and you will probably get stuck on them for life. In our household, cactus got its prickly grip on us when Mom found a cactus gift squatting in the center of our kitchen table.

As far back as I can remember there has always been a cactus sitting somewhere in our house, as a dare, or taunting us to touch them. Though they carried a very definite warning sign, we still tried to pat them, but "ONLY ONCE". I even recall sitting on a long, needle-sharp, prickly pear cactus, that somehow had been left on the lawn.

Cacti are an easily cared-for plant. Given porous soil, good drainage, bright light, and not too much water, they will thrive. During the summer they do well in the garden. We usually have a special cactus spot in ours. Our "Dainty Bess" has bloomed outside for the last three summers. About the beginning of August we start placing them in planters for the house. It is important to have them in cool places during the winter, either east or south windows.

There are over two thousand known cacti. Some like the five ton Saquaros rise to heights of fifty feet. Others like the *Mammillaria* are only thimble-size, almost lost from view. There are again many types of cacti that endure sweltering summer heat up to one hundred and forty degrees Fahrenheit. Others can tolerate winter chill down to forty degrees below zero and some can even do without a drop of water for several years.

Cacti family members can survive without water because of thick root pipelines which suck in the water to the stem where pulpy material holds the water until needed. Our cacti have always grown in planters of four to five inches depth.

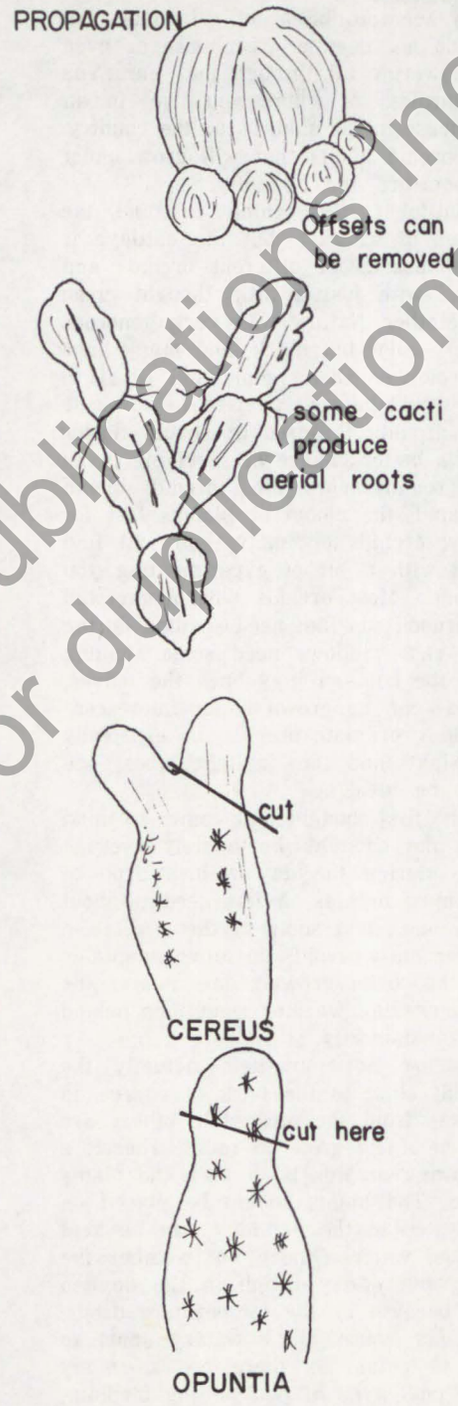
Last summer, after an abundance of "off-springs", we decided to transplant them. Then, because of a lack of planter space we decided to try a shallow container one and a half inch deep pan. For this, I robbed my mother of her favourite cake pan and set to work. Due to the shallowness, a specially mixed soil was used. It turned out to be about three-eighths good top soil and five-eighths sand with a high clay content. The clay content proved to be a good anchorage for my tall barrel (five and a half inches) and *Opuntia* Compressor (five inch) cactus.

To make the arrangement attractive and pleasing to the eye, the large cacti were placed with the taller succulents towards the center of the pan; while smaller plants were arranged around the outer edge. This proved successful for two reasons. Firstly, the larger plants could and did remain anchored. The low lying succulents, which require a little more moisture than the cacti, could be watered almost individually. Thus the redleafed rainbow succulent could be watered at will.

Our collection of cacti consists of: prickly pear, torch caeli saquera, peach monarch pincushion, golden star, angel wings, and bunny ears. The succulents that were interspersed among the cacti were: Zebra Haworthid, calico ox tongue, burro tail, Pandaplant, hens and chicks and green jade.

One of the many entertaining features and joys of growing cacti and succulents is their propagation. All but one of our plants have been gifts or been traded. To start another plant, all you need usually is the leaf of the mother plant. This takes root and grows quickly as long as the soil is moist.

Our latest gift was three new types of cacti that are natives of Manitoba and come from our Manitoba desert. We have a great deal of confidence that they will grow and thrive like the rest of their species.



Orchids Can Be Grown By Anyone

DOROTHY J. JENSEN

To many people that statement may seem to be a bit ridiculous, but orchids can be grown by anyone. You do not need a greenhouse or even a Wardian case to have orchid plants flowering all through the year. You can grow orchids in your windows regardless of where you live, in an apartment in the heart of the city, or a house in the suburbs or the country. But you do need to select the types of orchid plants that will grow under your particular conditions of light, temperature and humidity.

When one mentions orchids, the beautiful *Cattleya* comes to mind, the corsage flower that every woman dreams of wearing, but the cattleya is just one of many species. There are thousands of different orchids and blooms may be had all the year around with just a little thought given in selecting your plants. With orchids Mother Nature was very generous with colors; they come in just about every color but black, and many have splashes or markings of a contrasting color on their petals and sepals.

When first starting with orchids one would be well advised to purchase mature plants, that is a plant that has already flowered or should flower on the next growth. A mature plant has a better chance of surviving in an apartment or house while you learn its requirements. Most orchids bloom just once a year but depending on the kind, the bloom or blooms last for several weeks. Whether you grow a few orchids or many, you will find that the plants indicate their needs and with a bit of experimenting you will find just the right spot for each one. Most orchids will bloom well with four hours of direct morning or afternoon sun, but need shading during the hottest part of the day. South and east windows need some shading such as a thin curtain at mid-day when the hot sun may burn the leaves. If no suitable window is available orchids can be grown under fluorescent lights. Some kinds, such as the *Phalaenopsis* or moth orchids, do especially well. I use a combination of the "Gro-lux" and the daylight tubes, one gro-lux and two daylight tubes seem to be ideal.

When one mentions growing orchids the first thought that comes to mind is heating. How am I going to keep it hot enough? Fortunately average home temperatures of 68 to 72 degrees during the day with a drop of about 10 degrees during the night suits most orchids. A few need it about 10 degrees cooler, such as the *Odontoglossum,* and some of the *Oncidiums* require about 10 degrees warmer. However most orchids do prove adaptable and by careful placing, such as putting the cooler growing ones nearer the window during the winter and the plants needing warmer conditions behind them you can grow these plants quite satisfactorily.

Contrary to most thinking, orchids are not parasites; actually the majority are epiphytes or air plants, that cling to the bark of a tree so that their roots may take food and water from the air, while others are terrestrials of soil growing types and even a few grow on rocks. Therefore one of the most important things in growing orchids is to keep the plants up so the air may circulate about them. The plants should be placed on lath or hardware cloth above pans of water so the humidity can be kept up but the plants are not standing in the water. During hot weather the plants can be misted with a fine spray but early enough in the day so the water doesn't remain on the plants because as the temperature drops, water, especially on the new growth, can cause black watery spots to develop. A watering schedule is hard to define as there are so many factors involved, such as the size of the pots, type of pot, potting medium,

whether fir bark or osmunda, temperature, etc. But when in doubt, it is better to leave the watering another day or two, as more orchids are killed by over-watering then under watering. A soggy potting medium is fatal to the orchid roots. Should the roots rot off it takes the plant a long time to recover. Then one must, as a rule, wait for a new eye to develop and mature and the new growth to develop new roots.

High humidity used to be considered the most important requisite for orchids, but I have found that placing the pots above trays of water with the occasional misting of plants will provide adequate humidity.

During the summer months those fortunate enough to have a yard or even a porch will find that placing the plants outside, where they will be protected from harsh winds and noonday sun will do their orchids a world of good. The fresh air and sunshine and the odd rainfall will set their plants up for another winter indoors. But a word of warning, watch out for slugs, they delight on feasting on the new growths whether roots or leaves and for dessert will eat the buds.

For those really interested in growing orchids the local libraries carry a number of books on orchids. One that I have found very good is "Growing Orchids at Your Windows" by Jack Kramer. He lists about 200 kinds he has tried and gives the requirements, blooming periods, etc. of each kind so you can pick types that will grow under your conditions. And in the back of the book he lists a number of growers and orchid supply houses you can contact.

But a word of warning, once you have flowered an orchid plant you are lost. Growing orchids becomes as bad a habit as taking drugs; you just have to have more and more. I know for from windowsill growing I moved into a green house 7 feet by 14 feet and then had to have a basement room for the overflow and now that is just about full.

Renew African Violets To Keep Them Healthy

MRS. S. W. SCHORTINGHUIS

For heaven's sake, let's do something about those violet plants that look so bad!

What about this one that looks more like a palm tree than a Saintpaulia — how on earth did it get that long neck? (Illustration "A") Then, this poor droopy looking specimen! Could it have root and crown rot?

Well, the long neck can wait — the droopy one is the sick one! There, with a pencil pushed up through the hole in the bottom of the pot (what, there is no hole in the bottom of the pot?! — no wonder you have a patient), the plant is out of the pot and ready for an operation. (Illustration "B")

Gently wash all the soil away from the root system. Take a sharp knife and cut through the stem. The stem should be firm and white — but no, there it is, soft and brownish. The trick is to cut the stem above the rot, making sure all rot has been removed, and it is a good idea to gently scrape all the scaling off the stem. Then lightly brush all cut areas with sulphur powder; this helps to heal the cut and to prevent further rot.

The next step is to take a clean pot (complete with a hole in the bottom), put about ¼ inch of charcoal in first, then fill the pot with vermiculite. Place your plant in the pot and fill around the stem with the vermiculite. Set your pot in a dish of warm water and let the vermiculite absorb as much water as it wants.

Slip the pot into a plastic bag — you can tie the bag or leave it open. I prefer leaving mine open as you do get condensation if it is tied and unless you open the bag periodically, the lovely new centre leaves can be lost. There, you have a small greenhouse. Within two to three weeks you should have new roots on your plant, and can start fertilizing lightly about every ten days. When your plant has grown a good root system you can pot with your regular soil mix.

Now for the long neck! You have two choices.

First, remove plant from the pot and, with a sharp knife, cut off (Illustration "B") some of the bottom of the root system. Make sure there is no rot, brush root ends lightly with sulphur powder and, (Illustration "C") repot in fresh soil mix and water with a light solution of your favorite fertilizer. Incidentally, **never fertilize a dry plant.** You will chance burning the roots.

However, the neck of the plant may just be too long and your second choice is to cut through the stem, leaving about 1½ inches. Gently scrape any scaling off the sides of the stem.

Now place your patient (Illustration "D") in a glass that will support the outside leaves. Fill the glass with water, being sure that only about ¼ of an inch of the stem is in the water. Soon you will see new roots appearing. When a good root system has formed, you can then pot into your soil mix.

I find that you should never over-pot — better to let the plant become established, then move to a larger pot. I find that if I pot a plant with a small root system into a large pot, I end up with root rot every time.

Garden Roses

Gleanings from CBC Sunday morning radio talks by The "Prairie Gardener"

H. F. HARP

Whether you grow roses for your own pleasure, to decorate the garden, or cut a few to take indoors, or whether you grow them for exhibition, there's tremendous satisfaction in growing a rose; Queen of Flowers, exquisite in form, variety of color, and usually with a delicate fragrance.

The season of bloom extends from July to September, and occasionally a bit later if the first frosts have been light and the plants well protected.

Healthy and well hardened roses that are properly protected will survive the strongest blast, whereas weaklings stand little chance of survival no matter how well you care for them. If you start out with a weak plant in the spring it will remain a weakling all through the season.

The rewards in the rose garden will be in proportion to your efforts to get the most out of the project. You should start a regular program of watering, fertilizing, and spraying from the time the plants are set out until you bed them down for the winter.

Buy the best top-grade plants from the prairie nurserymen.

Prune back each cane to leave 3 or 4 live buds, the topmost one facing outwards. If the top bud looks a bit dry, make a lower cut as it is useless to leave a half-dead bud and expect it to produce a strong shoot. Don't be afraid to cut off a portion of the green stems. New shoots will soon grow to terminate in large, well-formed flowers.

Sunlight is important but an hour or two of shade in the middle of the day will be welcome.

One of the best investments you will make is acid peat. A six cubic foot large bale is enough for a rose bed 10 by 5 feet, dug in before the plants are set out. Then use acid peat as a mulch in July.

Give a soaking once a week, to wet soil to depth of a foot. If you water during the heat of the day you lose up to one-third of the water by evaporation. Keep the water off the leaves. If you have only a few plants, make a shallow depression around each and let the hose run slowly until the soil is thoroughly soaked. A test hole may be made to see if wet to the one-foot level. As a general rule, the rose bed will stand a weekly soaking in early July, continuing through August and into the early part of September. Hybrid tea roses need plenty of water and they rarely get sufficient from rains even in areas where rainfall is considered ample for most crops. The use of the garden sprinkler is not recommended as it wets the leaves and increases the chances of spreading Black Spot. Besides this, there is a considerable loss of water by evaporation.

More newly planted roses are killed by overwatering than by any other means. The soil must have air to sustain the life-giving bacteria.

In planting it will pay to dig a hole for each plant, making it 2 feet across and 1½ feet deep. If your soil is inclined to be alkaline dig in a pailful of acid peat for each plant. Add a dressing of 11-48-0 at the rate of a handful to each square yard of ground. The most satisfactory depth has been with the union of stock and scion covered with 2 inches of soil. If the soil is sandy plants can go a little deeper.

Pruning the newly set rose removes the weak shoots, say those less than pencil thickness, then the stronger ones are reduced to 2 or 3 buds. When pruned the new plant receives a little mound of soil around its base to give

a bit of protection against frost and to insulate the lower part of the stems against drying winds. In June the mound of soil can be levelled out.

In the southern part of the prairies the 24th of May is considered the right time to prune established tender roses. However, a few days one way or another will not matter and the wise gardener will be guided by the weather. The actual pruning is simple enough. You first cut back to the ground all dead and weak shoots. Then prune back the stronger growths to an outward-facing live bud.

Fertilizing. A handful of 11-48-0 is scattered around each plant, raked in and given a generous watering. Bone meal is not used as it tends to build up alkali in the soil that is high in lime. To make the soil slightly acid powdered sulphur may be dug into the soil at rate of 1 pound to 100 square feet. It is beneficial but a pailful of acid peat dug in at planting time is preferred.

Mulch the plants with an inch of peat early in July to conserve moisture, prevent soil from cracking, and to make a cushion so that heavy rains will not splash the leaves and thus spread the spores of Black Spot. Before mulch is spread, all weeds are removed and the soil well watered. Second choices to granulated peat are grass clippings and straw. Regardless of what kind of shelter exists roses should be mulched. One inch of peat is helpful but 2 inches gives better insulation against heat and loss of soil moisture. Its acid reaction is beneficial to limy prairie soil.

Feeding and watering should not be continued beyond the end of August or the canes may not ripen off properly. If September is a dry month, you'll have to water the plants, — but don't overdo it. It may be necessary to water plants for the last time just before freeze-up to make sure they don't go into winter in dry soil . . . plants in dry soil tend to suffer more winter injury than those plump with moisture.

Winter mulches: The straw is usually taken off in late April; and the sawdust, or whatever is used to mound up the plant is removed a week or so later. The straw is kept handy in case a mid-May frost is forecast. Clean up all traces of straw and debris. Last year's leaves are likely infected with spores of Black Spot. The spores are carried over winter on leaves and stems ready to re-infect the new growth.

Spraying: Start a weekly spray program in June and continue without letup until the end of the growing season. Aphids usually appear in mid-June and multiply rapidly unless combatted. Spider mites arrive with the dry weather. Spray in the morning so plants will have dry leaves before night. Drench the plants with Malathion and Kelthane used according to directions.

Mildew: You may wonder why this fungus disease is severe in areas of low rainfall. It is because the dry air is buoyant to carry the ripe spores and the humidity at the surface of the young leaves is high enough to germinate these spores. Karathane has given good control and is preferred to Flowers of Sulphur which brings an unsightly appearance to the plant.

In August hybrid tea roses will be in a bit of a slump. The plants are making new shoots that will terminate in a second crop of blooms in September.

Cut flowers: Every time you cut a rose you are pruning the plant, so keep this in mind and go easy. Use a sharp knife or secateur and cut the stem back to an outward-facing bud. Be sure and leave three leaves or more below the cut and the main stem from whence the shoot emerged. Don't mutilate the plant by taking more than a 9-inch stem. If more than 8 or 9 inches are removed you'll be cutting off too many leaves, and the plant needs all of its leaves to manufacture food to build a vigorous plant by the end of the season.

The flowers are best cut when the outer petals start to unfold. Some varieties have more petals than others and they may be left on the plant

a day or two longer than those with less petals.

If the cut blooms have been out of water long enough to wilt, they can be revived in hot water, first making a slanting cut across the stem before plunging it into water heated to a temperature as hot as you can safely put your hands in. Leave for 5 minutes, then plunge into deep cold water. Old flowers will not respond. There's nothing you can do to revive them when they get to the wilt stage.

Garden Rose Varieties — notes:

— Peace is still the most outstanding rose you can buy. It produces superb blooms through the hot days and the leaves are always a dark glossy green. "The Queen of the Show".

— Tropicana is gaining in popularity.

— Chrysler Imperial is one of the best red roses. Flowers are large, heavily scented, the color a brilliant crimson and the plant vigorous and free-blooming.

— Crimson Glory is still esteemed for its dark red flowers of good substance and fragrance. It has a weak stem, otherwise a first-class rose in every respect.

— Mr. Lincoln is a fine red, winner of All America Award in 1965.

— Cherry Glow, red flowers on a strong plant with attractive bronze-green leaves.

— Christian Dior, a superb red but lacks fragrance and is susceptible to mildew.

— Ena Harkness, a refined red rose, the half-opened buds beautifully formed, the petals brilliant crimson-scarlet, moderate scent, leaves dark green and durable.

— Konrad Adenauer, crimson with shapely, sweet scented blooms but color is less attractive than some other reds.

— Miss Canada is a good rose, with large shapely flowers of a lively shade of pink. The petals are cerise with a silvery reverse and they seem to stand hot weather without fading or 'bluing'. It continues to produce richly scented bloom all through the season.

— Virgo has been found the most satisfactory white. The medium sized flowers are shapely, and the petals pure white and weatherproof.

— Queen Elizabeth, a grandiflora, is tall, upright with attractive foliage and clear pink flowers which are produced in abundance all through the season.

— Elizabeth of Glamis is a floribunda of great substance with fragrant salmon-pink blooms in profusion.

Yellow roses have their own charm but tend to be less vigorous than some of the pinks and reds; and they lack the heavy fragrance of Chrysler Imperial and Crimson Glory. Sutter's Gold, Eclipse, Buccaneer, and Isobel Harkness are first-class yellow roses.

— Orange Triumph is one of the hardiest of the polyanthas. It survives year after year to produce its brilliant red flowers in huge trusses, all through the summer and well into fall.

Climbing Roses are more difficult to grow than the hybrid teas. The reason is that they bloom on last year's canes and these have to be safely carried through the winter or there'll be no bloom. The best chance of success is to plant them on the east or south side of the house, about 2 feet from the wall, digging a deep hole and filling it with good soil.

— Blaze is recommended; also Climbing American Beauty.

— New Dawn differs in that it tends to bloom on the current year's wood.

Remember it pays to keep the plants healthy and vigorous. They not only produce better blooms, they survive the ordeal of winter in better shape.

Junior Activities in the Regina Horticultural Society

MRS. P. J. ACHTZNER

For over sixteen years the Regina Horticultural Society has had a Children's Garden project. Its aim is to encourage children to plant their own gardens, to look after them and then take part in the Society's annual show by displaying their vegetables and flowers and consequently to become interested in this fascinating and healthful activity.

Each Spring members of our Society talk to children's groups in church and school auditoriums as well as contact all children who have participated in this project in previous years. For a membership fee of twenty-five cents we make available to boys and girls from eight to fourteen years of age, a collection of seeds consisting of individual packets of three vegetables; carrots, beets and beans; and three kinds of flowers; marigolds, zinnias and bachelor buttons.

We have found the most economical and satisfactory way of obtaining these collections is to buy chosen varieties of seeds in bulk and then measure and package each variety in small labeled envelopes, with identical collections placed in larger envelopes.

At the time of distribution of these seed collections we also give these young people helpful planting information covering the laying out of their garden, depth of seed planting, germination etc.

We make one stipulation. This must be their garden. Other than dig and prepare the soil and supervise, their parents must not interfere.

Members of our Committee also give demonstrations on planting of bulbs, transplanting seedlings, pruning trees and shrubs, how to mix potting soil, and related subjects to interested youngsters such as groups working towards a gardener's badge in Cubs, Brownies, Scouts and Guides.

During the first week in August each garden is visited and judged by a committee of six people. The Society also has a Novice Section for those both working on a garden and showing at the bench show for the first time so that these youngsters need not compete with gardeners of more experience. Prizes are awarded to the twelve best gardeners. The Society also awards annually four trophies as follows; — best children's garden in the city, best garden grown by an eight year old, and at the bench show to the competitor awarded highest points for cut flowers, and to the one gaining highest aggregate points. Cash prizes are also given at the show.

At the time of the garden judging a leaflet is left with each gardener outlining the place, date, and time of our bench show, along with suggestions about the method of preparing and cleaning their vegetables and flowers for show. Standards are high and competition is keen. Quality, uniformity and cleanliness are stressed and the results compare favorably with the adult section of the show.

One creative and interesting part of the Children's Section of our show is where they fashion animal or human figures from whole or parts of vegetables. It is amazing to see the ideas and ingenuity of these youthful exhibitors. Another section is for flower arranging, using locally grown flowers only. A large working table is set up where the arrangements are made up. It is a pleasure and a thrill to see the creative results growing under their finger tips. The results are very beautiful and add much to the show.

Five Years of Horticultural Education in Alberta

Student Residence Complex, Agricultural and Vocational College, Olds, Alberta

B. J. GOODWIN

The Agricultural and Vocational College at Olds offers the only Horticultural Technology training program in Western Canada. In this program men and women prepare themselves as semi-professional workers in a challenging and expanding vocation. Through classroom study and on-the-job training, students acquire a broad general knowledge of the principles and practices of horticulture. Graduates have already assumed a wide variety of responsible positions in the commercial production of food and ornamental plants, parks systems and projects, as support technicians in horticultural and forestry research, and in commercial landscaping and government services.

The School of Horticulture is housed in a modern Plant Science Building with excellent classroom and laboratory facilities, a 4,000 sheet herbarium, 5,000 square feet of greenhouse and a horticultural library. The long established campus with its generous selection of ornamental plant materials, orchards and gardens provides excellent opportunities for field studies. An ultra modern residence which opened in 1968 provides excellent accommodation for 500 students at low cost.

Three staff members devote the major part of their time to horticultural instruction and, fortunately, since the course is one of several in an expanding college environment, specialists in other departments also provide instruction to horticultural students. By graduation time at least ten instructors have contributed to the program.

The extensive horticultural lecture and laboratory program includes, Plant Physiology and Plant Breeding, Soils and Fertilizers, Landscaping and Surveying, Floriculture and Floral Design, Commercial Vegetables and Fruit Production, Horticulture Practices and Plant Pests, Diseases, Weeds and Insects. The course is further enriched by instruction covering Mechanics, Business Administration and a variety of Seminars. In addition, students receive instruction in English, Mathematics, and Public Speaking.

The two-year program aims include both classroom and on-the-job training. From April to September during each of the two years of the program, students are placed with approved employers who agree and strive to give trainees as broad an experience in horticulture as their particular enterprise allows. On-the-job training is a vital component of the program.

Instructor Bujita with class observing succulent plant characteristics.

Instructor B. J. Goodwin reviewing insect collection of horticultural students

Current employment picture — Horticulture Technology **Students and Graduates — August 1968.**

	56 individuals surveyed	
Parks Systems (Mainly City) Development & Maintenance	15	26.4%
Horticultural Technicians (Government, University, Industry)	10	17.6%
Landscape Industry (Planning and Construction)	8	14%
University (Greenhouses, Grounds, Botanic Gardens)	6	10.5%
Federal Forestry — Research Technicians	5	8.8%
Commercial Vegetable Industry	5	8.8%
Commercial Nursery Operation	5	8.8%
Commercial Floriculture	2	3.7%
	56	

Leaders in the horticultural industry recognized the need for technology training to support and upgrade the industry. Course work has now been offered for five years and has, in part, fulfilled the need. However, to date the demand for students and graduates has exceeded the supply — in several years only one third or one half of the job opportunities were filled due to lack of available graduates. Enrolment has been increased from an original quota of 12 to 20, and entrance requirements have been raised. Interest in the course is strong and is evident far beyond the borders of the province. Students from five provinces are presently enrolled in the freshman class.

Continued foresight is needed as the course moves into its second five-year period. It is quite possible that some types of third year specialization can soon be justified. It is also probable that the present enrolment is inadequate to the needs of an expanding industry on the great plains. Expansion of the technology program in accordance with the demonstrated need is the subject of a current survey so that a supply to the industry of well trained personnel who can accept and cope with the expected and interesting challenges of the next decade will be assured.

Provincial Horticultural Shows

The Alberta Provincial Horticulture Show will be held in Olds, Alberta during Horticultural Week commencing August 11, 1969. Watch for publication of exact dates.

The Fourteenth Winnipeg International Flower Show, sponsored by the Winnipeg Gladiolus Society and the Winnipeg Horticultural Society will be held on August 21st and 22nd, 1969, in the Polo Park Shopping Mall, Winnipeg, Manitoba.

The Eighth Saskatchewan Provincial Horticultural Show and twenty-fifth Provincial Fruit Show will be held in Prince Albert, Saskatchewan on August 21st and 22nd in conjunction with the thirty-seventh Annual Convention of Saskatchewan Horticultural Societies.

A. J. Porter — Awarded The Certificate of Merit, 1968

D. R. ROBINSON

In 1958 the Saskatchewan Horticultural Societies' Association made available the Certificate of Merit to be awarded to amateur or non-professional gardeners who have made an outstanding contribution to prairie horticulture. To date there have been 13 recipients of this award. At the 1968 convention of this association the Certificate of Merit was awarded to A. J. Porter of Parkside, Saskatchewan. Mr. Porter is a well known nurseryman and one of a small group of amateur plant breeders of the west. Some reference to his plant introductions will be found in the 1963 edition of the Prairie Garden. Although interested in a variety of plants he has worked particularly with strawberries, raspberries and lilies. Some of his more important strawberry introductions are: Sparta, Pixie, Sweetheart, Northerner, Parkland and Jubilee. One of the hardiest black raspberries presently available is Mr. Porter's introduction, Honeywood Black. His other raspberry introductions include Honeyking and Redman. At least 14 varieties of lilies have been developed by Mr. Porter: some of the leading varieties are Golden Jubilee, Orange Light, Pink Champagne, Firebright, Delicious, Redland and Rosabelle. (It may be noted, also, that he had been active in acquainting the public with the Barber lilies, varieties originated at Elfros, Saskatchewan.)

In addition to the plants mentioned above Mr. Porter has introduced two varieties of black currants and one each of gooseberry, sandcherry and crabapple.

Mr. Porter has been an active supporter of the Saskatchewan and Prairie Nurserymen's Associations and The Western Canadian Society for Horticulture. In 1955 Honorary Life Membership in the Saskatchewan Horticultural Societies' Association was conferred on him in recognition of his contributions to prairie horticulture and in 1963 he was selected as the eleventh recipient of the Stevenson Memorial Gold Medal for his "conspicuous achievement in the field of practical horticulture". At the 1968 convention Mr. Porter was elected President of the Saskatchewan Horticultural Societies' Association.

Pruning Fruit Trees

J. A. MENZIES AND A. GUDZIAK

Pruning of fruit trees has two main objectives. The first is to develop a structurally strong tree. This stage, more or less confined to the early years, is usually referred to as training rather than pruning. The second objective, lasting through the life of the tree, is to control the shape and maintain the health, strength and cropping potential of the tree.

Pruning is, to a considerable extent, an art and cannot be done on the basis of hard and fast rules. Every tree differs from every other tree in size, location of main limbs, vigor of individual limbs, etc. Some varieties tend to grow upright, some to spread. Some varieties of trees are easy to train, some like the Almey flowering crabapple are difficult to control. The pruner must approach each tree realizing that these differences exist and he must take a long hard look at every tree before he begins to prune. If you make a mistake and remove the wrong branch it is very difficult to stick it back on again.

Although we said there are no hard and fast rules which should be followed, there are several points which are very important in pruning and which we would like to cover now.

Time of Pruning. The best time to prune is in early spring, just before growth starts, because at this time healing of wounds is most rapid. Some time in April or even early May when the snow has gone, when it is easy to walk around the trees and when the weather is sunny and warm would probably be the most enjoyable time.

Amount to Prune. A very good "rule" to follow is to remove no more wood than is necessary to accomplish your objectives. Overpruning will almost always be more damaging and create more problems than underpruning. If a tree, for one reason or another, does require considerable pruning it would be best to spread the pruning over two or more years rather than do it all in one year. Another point is that large wounds heal slowly and can serve as a point of entry for disease organisms. It is always better to remove unwanted branches while they are small. If the trees are carefully examined every spring, branches that are going to create problems in the future can be detected and removed while still small.

Directional Pruning

The direction of growth can be controlled to a considerable extent by pruning. Heading back to outward growing branches and buds will produce a more open spreading tree. If a more upright type of growth is desired prune back to inward branches and buds. In so heading back your branches always leave a terminal bud as illustrated 4(a). For further illustration 4(b) is cut too close while 4(c) is cut too long and square.

Making Cuts. All cuts should be made flush with the branch or trunk from which the part is cut. Do not leave stubs because the callus tissue cannot heal over it and the stub decays (Fig. 2c). The decay may work back into the branch or trunk, permanently injuring the tree. Do not cut too close because then you leave an unnecessarily large wound (Fig. 2b). The correct position for the cut is shown in Fig. 2a.

With small branches a single cut will do the job but with larger branches a single cut may strip the bark and wood below the cut. These large branches should be removed in three steps. Make the first cut on the underside of the branch a few inches from the main limb or trunk and saw about one-third of

the way through. Make the second cut on top of the branch about one inch or so beyond the bottom cut, sawing until the branch splits off. With the third cut remove the stub flush with the main limb or trunk.

Treatment of Wounds. All cut surfaces made with a saw should be trimmed with a sharp knife to remove stubs or lips of wood and bark and to smooth the ragged cut left by the saw. A wound dressing should be applied to all wounds more than 1 inch in diameter (Fig. 2d). There are a number of compounds which can be used: orange shellac, asphalt water emulsion, rubber base paints, grafting wax, etc. The wounds should be completely covered and in the case of large wounds it will be necessary to apply a new covering from time to time until the wounds have healed over completely.

Training Young Trees

The majority of the fruit trees planted on the prairies are two years old or older and therefore branched and some preliminary training will have been done in the nursery.

Training starts as soon as the young tree is planted. Part of the root system will have been lost during digging and planting and this loss must be compensated for by the removal of part of the top.

Fruit trees are trained to a variety of forms but the most popular form is the **modified leader.** Basically a central trunk is allowed to develop to a certain height and then cut back to a strong lateral branch. This system results in a tree with a strong main trunk, a tree which is lower since upward height is controlled and a somewhat more open tree.

The steps to follow in developing a modified leader tree are shown in Fig. 1. When received from the nursery the tree might have two or three upward growing branches, leaders, at the top of the tree. Remove all but one of these leaders, retaining the best and strongest. After choosing one leader, select the lowest scaffold branch. The lowest branch is allowed to develop anywhere from 1 to 3 feet from the ground. (Fig 1, c or d). The lower this

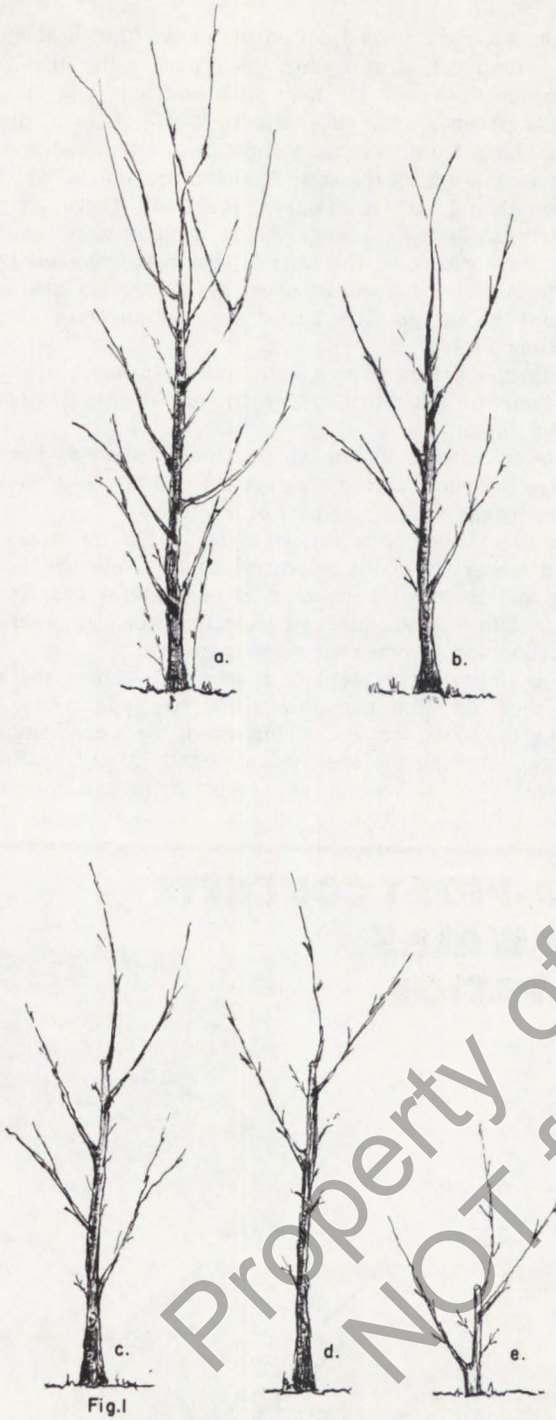


Fig.I

branch the greater the protection from sun scald and winter injury, the higher this branch the easier it is to move and work around the base of the tree.

The main scaffold branches should be selected so they are distributed up and around the trunk in a symmetrical or balanced fashion. The branches should be well separated up the trunk, anywhere from 6 to 15 inches apart. They should be distributed around the trunk in a spiral manner more or less as follows: The lowest branch should point to the south-west, the second branch to the north, the third to the south-east, the fourth to the north-east, the fifth to the east, etc. This is a rough picture but should give you the idea. The scaffold branches should have wide angles where they join the trunk. Narrow angled crotches are weak and tend to break under the weight of a heavy crop. Another point to mention is that the trunk should be larger or thicker than any of the main scaffold branches. Occasionally a branch grows strongly and becomes larger than the main trunk. If this is allowed to continue the branch becomes the dominant member and takes over from the main trunk. Such an overly vigorous branch should be cut back rather severely. This will tend to dwarf it and permit the main trunk to overtake it.

It will take one to three years to develop the main framework of the tree and you should end up with anywhere from three to seven main scaffold branches. When you have developed the desired number of scaffold branches remove the leader just above the topmost branch. This branch growing sideways to a greater or lesser extent becomes a "modified leader".

Open Centre Tree

If only three main scaffold branches are allowed to develop and the central leader is removed above the top branch then the tree is an open-centre type. This type of tree can be kept lower and is more open. It is not used much with the apple or pear but is used with the peach and plum. A number of the plum varieties which are grown on the prairies and which are wide spreading are suited to the open centre system, a system which basically does not try to maintain a central system. Plum varieties which have a more upright habit are well adapted to the modified leader system.

The **Bush System** is shown in Fig. 1e. In this system the tree is pruned back, at planted time, to a height of 12 to 15 inches from the ground. Three or four main scaffold branches are developed close to the ground. The lowest scaffold branch is only a few inches from the ground and the scaffolds roughly six inches apart. This tree, built very close to the ground, is particularly suited to the harsh winter climate of the prairies. The trunk and lower portions of the scaffold branches are usually well covered by snow giving good protection from extremely low temperatures, drying winds and sunscald.

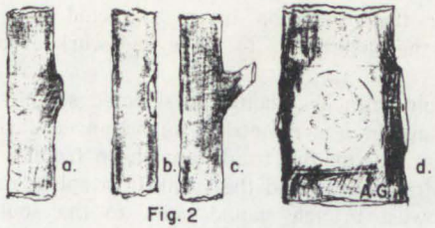


Fig. 2

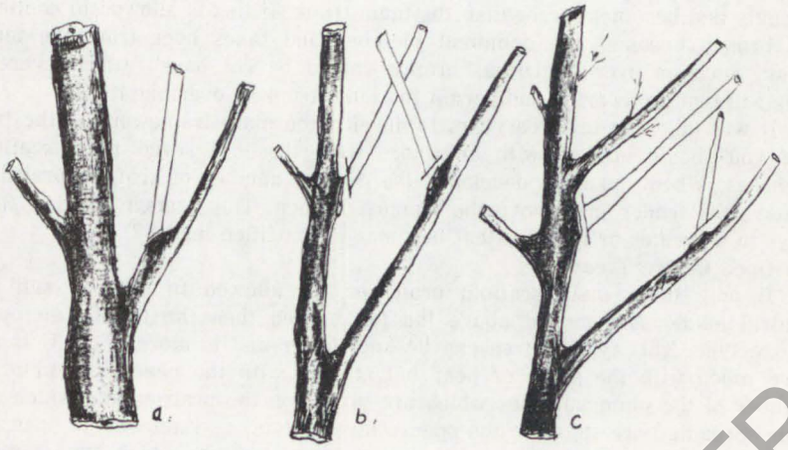


Fig. 3

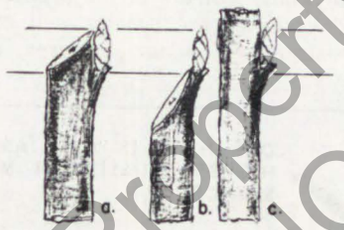


Fig. 4

Pruning Mature Trees. Once the permanent scaffold has been developed pruning becomes a matter of maintaining the health, vigor and form of the tree. Mature or bearing trees should be pruned lightly every spring. The specific reasons for pruning mature trees are as follows:

1. Removal of dead, diseased and broken branches whenever they are seen.
2. Removal of watersprouts. These grow very vigorously, usually straight up, and if not removed they usually interfere with permanent branches. However, if the tree has gaps or openings or a branch has been lost, watersprouts can be used to fill the gaps or replace the lost branch.
3. Thinning out branches, small and large, to prevent the tree from becoming overly dense and choked up with wood. Old trees in particular can become so dense that many branches in the centre of the tree weaken and die from shade.
4. Removal of "thin wood" or "weak wood". By definition, thin-wood is that wood which is four years or older and under ¼ inch in diameter. You will notice it as thin, slow-growing, drooping wood producing little fruit. Fruit that is produced is small and poorly-colored. Thin-wood tends to be located in the lower parts of the tree and towards the centre of the tree. It is easily distinguished from the strong, relatively rapid growing, thick, upward growing young wood which produces large, well-colored fruit. Thin-wood is not found much on younger trees but begins to appear when trees are anywhere from 15-20 years of age. It is common on older trees especially if they have been neglected or if they have very dense tops. If you are pruning an apple tree which has been neglected for some years a good way to start would be to remove all branches, both large and small, which contain quite a bit of thin-wood. Once you have done this, you may find that very little further pruning is necessary.
5. Remove one of two branches which are crossing and rubbing. (Fig 3b) Remove branches which are growing in the wrong direction, in towards the centre of the tree, downwards, etc. (Fig. 3a) Remove branches which are obviously going to cause future problems (Fig. 3c).
6. Remove one member of a narrow angled or V-shaped crotch. Care must be taken in removing one of the branches at a V-crotch in older trees because the real point of juncture will be some distance away from the apparent point.

The above remarks on training and pruning apply generally to the tree fruits grown on the prairies; apple, crabapple, pear, apricot and plum. As mentioned, the apple, crabapple and pear are best trained to the modified leader system or, where winter damage is a serious problem, the bush system. The apricot and plum can be trained to any of the three systems.

Annuals To Sow Outside

A. R. BUCKLEY

Some of the very best annuals can be sown directly outside where they are to flower. Some, in fact, are best treated this way, because they don't stand transplanting very well.

Very hard-coated seeds such as sweet peas, should be soaked for a day or so before being planted. You can sow most annuals outside about the middle of May, but for some tender kinds such as zinnias you should wait until the end of May, when the soil is much warmer.

On the prairies, check your catalogues for hardy annuals that can be sown in early May and the half-hardy types that must be sown after the days of frost have passed.

Sow the seeds thinly and not very deep, usually in drills made with the handle of a rake, about half an inch deep. Very small seeds such as balsam may be sown on top of the soil and lightly raked in. When the seeds have germinated and grown large enough to handle, thin out the seedlings so that they are three to six inches apart.

The following are some good annuals that I would recommend treating in this way:

The sweet alyssums Royal Carpet, Navy Blue and Rosie O'Day are varieties that give color to edgings; but for a completely dwarf and uniform sparkling white edging it is difficult to beat the older Carpet of Snow.

The Early Splendor amarantus is a new easily-grown foliage plant with large poinsettia-like heads of brilliant red leaves contrasting with the coppery bronze leaves produced lower down the stem.

New and improved balsams are fine for sowing outside. You can get the double camellia flowers for borders or even a hedge, and the sensational Tom Thumb dwarf cultivar for planting in the patio or rock garden.

Scotch pot-marigolds (*Calendula*) are long-suffering annuals that will grow in almost any place where the seed is planted, if the soil is moist enough to get them started. Try the new Geisha Girl or the Pacific Beauty mixture.

The annuals calliopsis (or coreopsis) will grow well with outdoor sowing and will provide an excellent source of cut flowers.

California poppy (*Eschscholtzia*) is another annual that must be sown where it is to grow. They are almost impossible to transplant but will flower profusely just where the seed falls. Try them on a sunny, sandy slope and they will produce a very colorful effect. The strain Mission Bells proved to be very superior to the regular mixture in the trials at the Plant Research Institute last year. This is a new mixture with hues of rose, scarlet, pink, gold, and cherry.

The night-scented stock (*Matthiola bicornis*) is excellent for sowing near a spot where you sit in the evening. It has a delicate fragrance, particularly noticeable after a hot humid day.

Nasturtiums are, of course, best sown outside. There are many double forms, all useful for poorer soils. Try the new Jewel types that form neat mounds of semi-double blooms. They grow best in a poor sandy soil, so avoid overfeeding.

Candytufts, cornflowers and cosmos are three annuals that are bound to please, both as effective plants outdoors and as cut flowers. Try the Giant White Hyacinth candytuft, the Jubilee Gem and Jubilee Rose, which are newer dwarf compact forms of cornflower, and the very showy Dazzler, Radiance and Pinkie cosmos. The new Sunset cosmos is best planted away

from the others, for its brilliant orange color is not very compatible with the pastel shades of its brethren. It is an almost foolproof cultivar that requires little attention except for cutting off the faded blooms.

Most home owners know about portulaca, an annual that is always sown outside. The single Jewel variety with deep rosy-purple flowers is extremely valuable as a good edging, ground cover or rock-garden plant.

Zinnias must be sown toward the end of May when the soil has warmed. They will flower in August and produce good cutting material for a special floral effect from then until frosts.

Tithonia 'Torch' has orange-scarlet flowers and grows quickly to a height of almost three feet. Cut in the bud stage for good cut-flowers. The stems are weak right under the blooms and will often break when the flowers are cut in full bloom.

Sweet peas, as mentioned earlier, should be sown early for the best germination and summer bloom. Instead of the usual climbing types, try the new Knee-Hi strain; these produce very showy long-stemmed flowers on bushes not more than three feet high.

Carpet of snow is a fine edging annual that may be sown where it is to flower.

Cultivar or Variety

W. A. CUMMING

I do not think that it matters much which term the general public uses. The point is that we should be familiar with the word cultivar and know what it means. It was coined by an international commission of biologists and written into the "International Code for the Nomenclature of Cultivated Plants". Cultivar was synthesized from the 2 words cultivated and variety. This new term was introduced to resolve the problem of having 2 different types of varieties in plants. Variety, or the Latin version "varietas", has been used for many years by botanists as one of the terms to distinguish naturally occurring variations within a species, so we have botanical variety and cultivated variety both being referred to as variety.

The well known Shubert chokecherry is an example which comes to mind. Scientifically its name is *Prunus virginiana* var. *melanocarpa* cv. Shubert. Var. refers to the naturally occurring botanical variety *melanocarpa* and cv. to the cultivated variety Shubert.

The same code authorized the use of single quotation marks to designate the cultivar name. In print the scientific name is italicized but not the cultivar name, hence *Prunus virginiana* L. var. *melanocarpa* (A. Nels.) Sarg. 'Shubert' is the correct scientific name for Shubert chokecherry. The L. and the (A. Nels.) Sarg. denote the person or persons who first described this species and its botanical variety.

Information, Please

Gardeners do well to build up a reference shelf of books and bulletins. Our governments and universities prepare bulletins and circulars for public distribution. In most cases they are supplied free of cost upon request.

Publications available from: Extension Division, Alberta Department of Agriculture, Edmonton, Alta.

200/01 Alberta Horticulture Guide 63 pages
200/24 Pruning Manual for Ornamental Trees and Shrubs, 11 pages
200/28 Soilless Growth of Hydroponics, 4 pages
200/731 Hotbeds, Cold Frames and Small Greenhouses, 5 pages
210/16 Fruit Tree Propagation, 56 pages
211/25 Hardy Stembuilders for
230 Small Fruit Growing in Alberta, 37 pages
Prairie Orchards, 8 pages
250/20-2 Home Vegetable Growing, 16 pages
250/24 Forcing of Vegetables, 3 pages
250/60 Home Storage of Vegetables, 8 pages
254 Rhubarb Planting and Growing, 3 pages
258 Growing Potatoes in the Home Garden, 8 pages
273/70 Lawn Building and Maintenance, 6 pages
275/20-1 Woody Ornamentals for the Prairie Provinces, 82 pages
276/20-1 Hedges for the Prairies, 30 pages
276/22 Planting Farm, Field and Roadside Shelterbelts in Alberta, 5 pages
277 The Design Approach to Landscaping, 7 pages
277/17 Farmstead Planning and Beautification, 45 pages
277/17-0 & 277/17-1 Basic Suggestions for Farmstead Planning 1 & 13 pages
281/20 Spring-Flowering Bulbs for Indoor Forcing, 4 pages
282/20-1 Growing Chrysanthemums in Alberta, 4 pages
282/20-2 Peonies, 4 pages
282/20-3 Iris and Daylilies, 4 pages
282/20-6 Lythrums for Home Gardens, 4 pages
282/21 Tuberous Begonias, 10 pages
283/20 Rose Growing in Alberta, 16 pages

Publications Branch, Manitoba Department of Agriculture, Winnipeg

A Farm Home Orchard for Manitoba, 5 pages
Commercial Raspberry Culture in Manitoba, 10 pages
Commercial Strawberry Culture in Manitoba, 8 pages
Currant and Gooseberry Spray Calendar for 1966 and 1967, 1 page
Hardy Stembuilders for Prairie Orchards, 5 pages
Insect Control on Fruit Plants (1968-1969), 12 pages
Raspberry Spray Calendar for 1968 and 1969, 1 page
Strawberry Spray Calendar for 1966 and 1967, 1 page
Bulb Culture, 7 pages
Culture of Gladiolus, 7 pages
Hardy Chrysanthemums for Manitoba Gardens, 2 pages
Insect Control on Ornamental Plants (1968-1969), 12 pages
Landscape Your Grounds for Better Living, 16 pages
Lawns, Their Preparation and Care, 7 pages
Peonies for the Prairie Garden, 2 pages
Recommended List of Annual and Perennial Flowers for Manitoba, folder
Plans for Foundation Plantings, 12 pages
Recommended List of Ornamental Shrubs and Trees for Manitoba, folder
Roses for Manitoba, 7 pages
The Winter Storage of Tender Bulbs, Tubers and Corms, 2 pages
Growing Potatoes in the Home Garden, 7 pages
Home Storage of Vegetables, 8 pages
Insect Control on Vegetables (1968-1969), 12 pages
Recommended List of Vegetables for Manitoba, folder
Sweet Corn Production in Manitoba, 2 pages
Table Turnip Production in Manitoba, 2 pages
Tomatoes in the Home Garden, 6 pages
Vegetable Disease Protection Calendar for Manitoba, folder
Fertilizer Recommendations for the Home Garden, 16 pages
Native Manitoba Plants in Bog, Bush and Prairie, 100 pages
Selection and Preparation of Vegetables, Fruit and Flowers for Exhibition, folder

Publications, Extension Division, University of Saskatchewan, Saskatoon

95—Annual Vegetables in Saskatchewan (Revised), 23 pages
123—Fruit Gardening in Saskatchewan, 21 pages
152—Potato Growing in Saskatchewan, 15 pages
156—Perennial Vegetables(Rd), 8 pg.
158—Grafting Fruit Trees, 7 pages
173—Landscaping the Urban Home, 14 pages
189—A Gardener's Guide to Soil Fertility, 15 pages

The Gardener's Bulletin, quarterly bulletin of the Saskatchewan Horticultral Societies' Association, is published by the Extension Department, University of Saskatchewan, Saskatoon, Sask. It carries articles on many garden subjects and is a valuable addition to our sparse horticultural literature in western Canada. Subscription is 2 years for one dollar.

The Alberta Horticulturist, Box 1083, Lacombe, Alta., is the quarterly bulletin of the Alberta Horticultural Association. The articles are on various subjects and the treatment meaty and of high order. Two years for one dollar.

SUPPLEMENTARY INDEX "THE PRAIRIE GARDEN"

An index listing the articles appearing in "The Prairie Garden" is prepared every few years, and is made available to anyone requesting a copy. The latest list, covering "The Prairie Garden" issues of 1966, '67 and '68, is now ready for distribution. It contains the name of the article, the author, the year of publication, and the page number on which the article may be found. The list is classified, divided into subsections such as — planning home grounds, lawns, diseases, tools, greenhouses insects and their control, fertilizers, propagation, soils, weeds, pruning, shrubs, trees, annual and perennial flowers, roses and vegetables.

Having such a list on hand will prove to be a big time saver for the busy gardener who may not have all the copies of "The Prairie Garden", or who may not have time to check through each table of contents for articles on a certain subject.

This Supplementary Index has been prepared by Mr. J. P. DeWet a loyal worker and supporter of "The Prairie Garden" for many years. The current Index is the third published, the first covered issues for the years 1946 - 1962, and the second covered those for 1963 - 1965. Many of the articles are cross-indexed when the information contained in one article may apply to more than one area of gardening.

Articles on landscaping are cross-indexed perhaps more so than others on the list, because most other specific fields are all more or less related to landscaping.

In the issues of "The Prairie Garden" for the past three years, one can find articles on all phases of landscaping, whether for a Centennial garden, arboretum or public garden, large commercial grounds, or for home grounds. These articles deal with such items as principles of planning, preparation of the soil, selection of hardy plant material in the form of trees, shrubs and flowers, propagation, planting, fertilizing, pruning and winter protection.

Details are given on starting a lawn, lawn maintenance, and problems in connection with lawns such as varieties of grass, and lawn pests. The topics listed comprise only part of the reference list of articles on landscaping.

Have you ever wondered about what to use as a ground cover under a clump of shrubs, or a hedge which requires no pruning and little if any maintenance? Have you ever wondered how and when to prune a shrub which blooms in late spring? You can be sure you'll find an answer in some issue of "The Prairie Garden".

As well as the "Supplementary Index, Prairie Garden, 1966 to 1968", the two earlier editions, 1946 - 1962, and 1963 - 1965, are still available on request to: Publications Branch, Manitoba Department of Agriculture, Winnipeg, Man.

Contributing Authors

We are indebted to the following Great Plains horticulturists, both professional and amateur, who, have supplied us the topical and interesting horticultural information contained in this publication.

Mrs. P. J. Achtzmer is an active member of the executive of the Regina Horticultural Society and is responsible for the activities of the Junior Section of this society.

Harvey T. Allen is a Research Officer in Horticulture, at the Canada Department of Agriculture, Research Branch, Lacombe, Alberta. He has contributed numerous outstanding articles on a variety of horticultural subjects to this publication.

J. R. Almey was Manitoba's first Provincial Horticulturist from 1921 to 1929 after which period he left to assume the position of Agricultural Agent with the C.P.R., retiring in 1960. He was one of the founders of the Stevenson Memorial Gold Medal Award. He has been very active in hybridizing gladiolus. Canada's Centennial tree "The Almey Crabapple" was named in his honor. He is still living in Winnipeg, Manitoba.

N. J. Bell — Mr. Bell is a graduate of the University of Manitoba. He is a soil specialist employed by the Soils and Crops Branch of the Manitoba Department of Agriculture. His office is at Dauphin, Manitoba. He is responsible for soils work of several agricultural representative districts.

Dr. C. Bernier is an Assistant Professor of the Department of Plant Science in the Faculty of Agriculture of the University of Manitoba at Winnipeg. His field is Plant Pathology and his specialty in the area of viruses. Dr. Bernier, a native of Manitoba, completed his undergraduate work in Manitoba and received his doctorate from the University of Minnesota.

A. R. Buckley is one of Canada's most outstanding horticulturists. He is with the Plant Research Institute, Ornamental Plant Section, Canada Department of Agriculture, Central Experimental Farm, Ottawa, Ont., Co.-author, "Ornamental Shrubs for Canada", 1968. He was formerly at Kew Gardens, London, England.

Dr. Carman A. Bliss is Associate Professor of Pharmacy and Chairman of Pharmacognosy, University of Saskatchewan, Saskatoon. Professor Bliss' areas of interest are in plants of medicinal importance and he is presently engaged in projects of the Cultivation of Peppermint in Saskatchewan; The Extraction and Isolation of Pharmocologically Active Principles from Plants and the Biosynthesis of Carbohydrates in Plants.

Dr. R. H. Burrage is Head, Insect Ecology Section, Canada Department of Agriculture, Research Branch, Saskatoon, Saskatchewan. Dr. Burrage's work is mainly on the ecology of wireworms and control.

Dr. B. B. Chubey is biochemist in charge of research on the quality of vegetable crops at the Research Branch, Canada Department of Agriculture Station in Morden. He is a graduate of the University of Manitoba, has completed his graduate studies at Penn. State University and the University of Minnesota. He has been at the Morden Station for 7 years.

W. A. Cumming is Chief of the Ornamentals and Fruit Sections of the Research Branch, Canada Department of Agriculture, Morden. He has contributed articles of a scientific nature to many periodicals. He is well known for his breeding work in chrysanthemums, perennial asters, lilacs, weigela, hawthorn, roses and ornamental crabapples.

Donald H. Dabbs is Assistant Professor of Horticulture, University of Saskatchewan, Saskatoon. Professor Dabbs' area of responsibility lies mainly with research and teaching as they relate to vegetable crops. He is presently involved in projects dealing with irrigation and nutritional studies of vegetable crops, effects of drought stress on certain vegetable crops, and the effects of light quality as well as exogenously applied plant growth regulators in a potato breeding program.

W. J. Emerson is gardener at the Government House, Winnipeg, a position he has held for 23 years. Previously he was with McFadyen Seeds, and Skinner's Nursery at Roblin. He also was in the R.C.A.F., 2nd World War.

J. O. Forbes is Chief of the Weeds Division in the Soils & Crops Branch, Manitoba Department of Agriculture. Mr. Forbes has some 30 weed inspectors located in local areas of the province and is in charge of all investigational and applied research control work in the province.

B. J. Godwin is well known in Agriculture and Horticulture having served on staff at all 3 of Alberta's Agricultural & Vocational Colleges in the last 15 years. In 1963 he joined the Olds College to work with industry in the development of educational programs to serve horticulture on the Great Plains.

Dr. G. H. Gubbels is doing work in physiology on cold hardiness of vegetable seedlings at the Research Station, Morden. He is originally from British Columbia, is a graduate of that university but has taken further studies at East Lansing, Michigan. For a number of years he did research work with the Canada Department of Agriculture at Mile 1019, Yukon Territories.

Herbert F. Harp is a Technical Officer, (Ornamental Horticulture), Canada Department of Agriculture, Research Station, Morden, Manitoba; "The Prairie Gardener" for C.B.C. broadcasts; authority on roses and garden flowers.

Dr. A. M. Harper is an entomologist with the Canada Department of Agriculture Research Branch, Lethbridge, Alberta. Dr. Harper's field of activity is the biology, ecology, and control of aphids and other sugar beet insects, poplar gall aphid and aphid cytology.

Dr. W. Hanec is assistant professor in the Department of Entomology at the University of Manitoba. He is a native of Manitoba and a graduate of the University here. His field of work is the ecology of the European Corn Borer in Manitoba. **Mr. Julian Tsang** who is a graduate student and native of Taiwan is studying with him with particular reference to the cold hardiness of this insect.

W. H. Hawkins is one of Calgary's most outstanding horticulturists. He has a wonderful collection of Fuchsias, including Tree Fuchsias. He does his own propagating. He also specializes in Tuberous Begonians and Gladiolus. Mrs. Hawkins is also an ardent gardener being possibly Calgary's most successful grower of African Violets.

Dorothy J. Jensen is a resident of Winnipeg, Manitoba. Mrs. Jensen has been growing orchids for many years and has found it an absorbing and fascinating hobby. She has done a considerable amount of hybridizing and has developed numerous orchid varieties of her own.

M. R. Kilcher is forage crop agronomist with the Canada Department of Agriculture, Research Branch, Swift Current, Sask. He is an authority on grasses.

George Krahn, is proprietor of Lakeshore Nurseries, Saskatoon, Sask. Mr. Krahn is a progressive nurseryman and active in horticultural and nursery organizations.

H. H. Marshall is head gardener and supervisor of grounds at the Canada Research Station in Brandon, a job he has held since 1946. Mr. Marshall has done considerable breeding work with Monardas, Chrysanthemums, Roses, Heuchera and Geum. In 1965 Mr. Marshall was presented with two awards for his introductions "Assiniboine Rose" and "Brandon Pink Heuchera".

D. B. McNeill is a graduate from the University of Manitoba. He is in charge of Skinner's Nursery Ltd., Roblin, Manitoba, operating the nursery for Mrs. F. L. Skinner, widow of the late Dr. Frank Skinner. As a close associate of the late Dr. Skinner, Mr. McNeill is an authority on the Skinner introductions.

J. A. Menzies and A. Gudziak — J. A. Menzies is Assistant Professor in the Department of Plant Science, University of Manitoba, Winnipeg, Man. His work is largely in the potato and small fruit area. He is in charge of regional potato variety trials in Manitoba. Mr. Gudziak is also on the same department as technician in charge of fruit work and is an authority on tree surgery. He is a graduate of the University of Poland.

P. J. Moran is Managing Director of the Wascana Centre Authority. Previously he was horticulturist on the Department of Public works, Province of Saskatchewan, Regina, Sask. in charge of the planting of the Government grounds in that city.

R. H. Patmore is owner and manager of Patmore Nurseries Ltd. in Brandon. Patmore Nurseries is probably the oldest commercial nursery operating in Manitoba at the present time. Mr. Patmore specializes in grafted evergreens but has a good supply of other ornamental trees, shrubs and perennials.

Louise Edna Pauls, age 11 is a student in Grade 7, in Winnipeg, Man. She has been absorbed for several years in her hobby of growing Cacti and Succulents. She is meticulous in keeping records of her results.

P. W. Petersen has been Agricultural Representative for the Saskatchewan Department of Agriculture at Yorkton since 1962. Previous to this he served in the same capacity at Hudson Bay. He has a B.S.A. degree from the University of Saskatchewan.

Dr. Stanley A. J. Pocock, Calgary, Alberta, is reputed to be Alberta's most outstanding authority and grower of native plants. He is also a photographer of note, as illustrated in his contribution to this book. He is a geologist by profession.

Fred C. W. Rice, Horticulturist, Winnipeg. Formerly administrator, Veterans Land Act and Executive Director, International Peace Garden. Authority on North American garden centers and commercial nurseries.

D. R. Robinson — Mr. Robinson, an agricultural graduate, is Extension Specialist in Horticulture with the University of Saskatchewan at Saskatoon. He is responsible for the supervision of horticultural societies in Saskatchewan. His studies of winter hardiness of tree fruits in his province are available in printed form.

G. A. Schoch is landscape architect for Metro Corporation of Greater Winnipeg, and as such is responsible for plans for boulevard plantings, and plantings on municipal golf courses and parks in the metro area. He is a valued member of the planning committee of the International Peace Garden, and a regular contributor to "The Prairie Garden".

Mrs. S. W. Schortinghuis is a past president of the Winnipeg African Violet Society and an authority on the culture of African Violets. She has won many prizes in local competitions.

W. C. Shelmerdine is now retired manager of Shelmerdine Nurseries Ltd., Roblin Blvd., Charleswood, Man. although still an employee of the firm established by him in 1937. The nurseries handle ornamental shrubs and trees, fruit plants and perennials. They operate a garden centre, do considerable landscape contracting as well as draw up landscape plans for home grounds.

Harvey D. Sparling, Q.C., a former barrister, solicitor, and magistrate of Portage la Prairie, Manitoba is well known for his fine fruit orchard. He was the grand champion of the Provincial Fruit Show of Manitoba in 1968, winning five trophies. Mr. Sparling is also an expert in growing roses.

Herman Temmerman is the technician in charge of fruit work at the Canada Research Station at Morden. He was responsible for the budding work done on the Stembuilder Orchard at Morden. He also owns and operates Morden Nurseries.

Dr. Chas Walkof is assistant director of the Research Branch, Canada Dept. of Agriculture at Morden. He is also head of the biochemistry and vegetable section. Over the years he and his staff have made significant contributions to Horticulture on the Great Plains in breeding of varieties of tomatoes, sweet corn, cucumbers, peas, as well as in cultural studies on most vegetable crops.

Helge Welling was born and educated in Denmark and came to Edmonton in the early 1950's. He is superintendent of the University of Alberta Greenhouses. He also operates his own tree and shrub nursery which he calls, "Welldon Nurseries".

R. D. Wodarz—Wyndmere, North Dakota, is proud of this orchardist. "He knows how to grow and he also knows how to show" our correspondent from North Dakota tells us. Many articles on fruit growing have appeared in horticultural publications of Minnesota and North Dakota. People of his state greatly appreciate his displays and entries at their fruit shows.

F. J. Weir is Provincial Horticulturist for Manitoba and Chief of the Horticultural Division of the Soils and Crops Branch. His specialties are ornamentals and landscaping.

P. H. Westdal is an entomologist with the Canada Department of Agriculture, Research Branch, Winnipeg, Manitoba. His specialty is the biology of virus of insects.

Dr. H. F. Wilkins is Assistant Professor and Research Scientist at the University of Minnesota, St. Paul Minnesota. The article reprinted herein is from The Minnesota Horticulturist, with the permission of the editor, Mr. E. M. Hunt.

Charles and Isabelle Young are two of the most active and successful gardeners in the Calgary area. They have won many trophies for their efforts. They are also very active members of the Calgary Garden Club executive. Mr. Young is in charge of the garden column in the Calgary Albertan to which both Mr. and Mrs. Young contribute numerous articles.

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