WILD FLOWERS OF WESTERN CANADA

S. Halverson.

WILD FLOWERS OF WESTERN CANADA

By

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With Sixty Plates from Original Photographs by the Author

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TO

MARGARET

NATURE

"The bubbling brook doth leap when I come by,
Because my feet find measure with its call;
The birds know when the friend they love is nigh,
For I am known to them, both great and small.
The flower that on the lonely hillside grows
Expects me there when spring its bloom has given;
And many a tree and bush my wanderings knows,
And e'en the clouds and silent stars of heaven;"

—*Jones Very.*

PREFACE

The plants pictured and described in this little book are for the most part quite common in Western Canada. With a territory so vast and varied in character as is ours, the reader will not expect to find them all in his own neighborhood, but he will find many of them, also others quite as beautiful and interesting. He may regret that some favorite flower is not included, but he may be sure that his regret is shared by the author who found it difficult to make the final selection. No two persons would have made an identical choice, still, it is believed that representative plants from all parts of the West except the extreme North and the Pacific slope have been included.

In a general way the plants are arranged according to their time of bloom, beginning with the early flowers of Spring. But owing to the extent of our country, to local conditions of soil and exposure, and to variations in weather from year to year, it is impossible to be exact as to either order or dates. Still, for a work of this kind, it was felt to be the best arrangement.

In writing of western wild flowers one meets the difficulty that many of them have as yet no generally recognized common name. Such names as far as possible have been hunted out and used. In some cases they lack definiteness, as where a common generic name has come into use and is applied loosely to any one or to all of the several species. To accurately identify the flower the botanical name is also given. As the photographs together with the notes on size, color, and habitat are believed to be quite sufficient to enable the reader to recognize any of the plants, it has not been thought necessary or desirable to give detailed technical descriptions.

The landscape pictures are introduced to give variety of interest and to direct attention to the fascinating subject of plant societies.

To know the name of a flower is, of course, but a preliminary to acquaintance. It is hoped that the presentation of certain facts in the life history of these plants may lead readers to more attentively observe the plants about them—to notice how they adapt themselves in structure and habit to their environment, how they bravely meet vicissitudes of fortune, how eagerly they take advantage of favorable opportunities, and how marvelously in form and service they and the insects are interrelated and mutually dependent. Reference to these subjects has been much curtailed by limitation of space but this is not necessarily a disadvantage. Were an attempt made to give the whole life history of each plant it would be attended by two dangers: first, its length might discourage many casual readers; and second, the more interested might be tempted to study the written story rather than the living plant. Hence, the endeavor has been to make the brief text stimulative and suggestive.

May we all find in the contemplation of the manifold beauties and wonders of Nature fresh joy, quickened sympathy, and enlarged outlook on life.

W. C. McCalla.

Glenbrook Farm,
Bremner, Alberta,
May, 1920.

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WILD FLOWERS OF WESTERN CANADA

GOLDEN PEA; PRAIRIE BEAN

Thermopsis rhombifolia (Nutt.) Richards

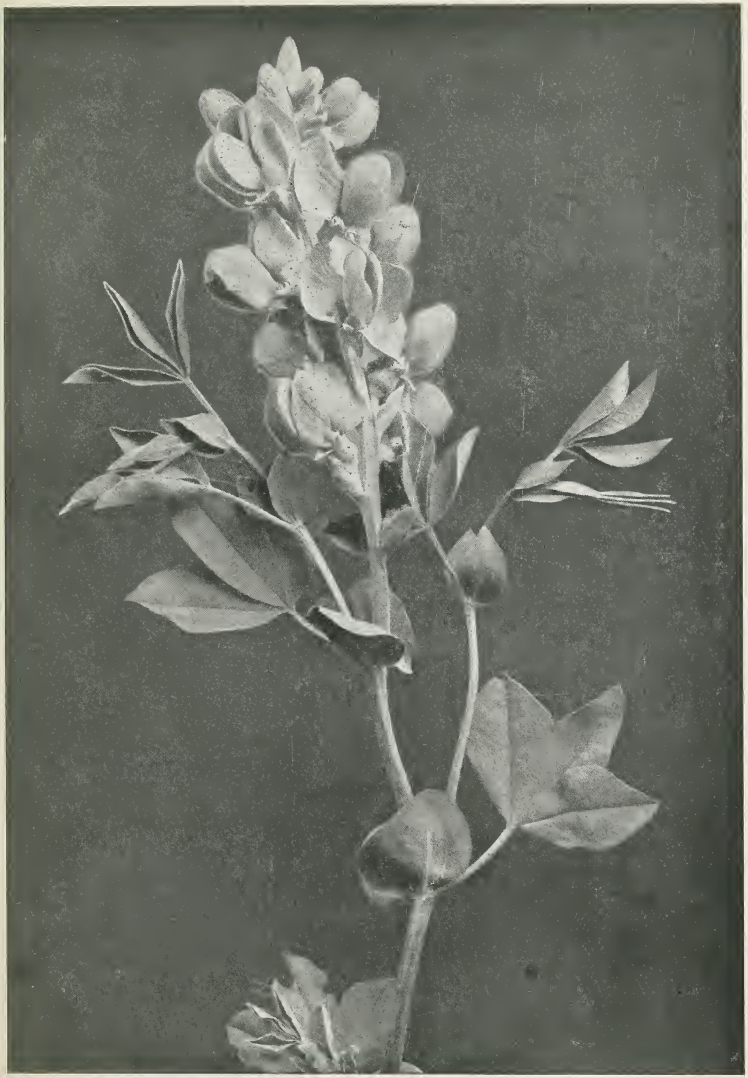
Pea Family

The early flowers are especially welcome and are eagerly looked for. It is an event of the year to find the first anemone, the well-known "crocus" of the prairie. Following this pioneer come the sweet coltsfoot, a dwarf buttercup, a tiny, leafy-stemmed violet, and, showiest of all, this splendid Golden Pea. It perfumes and brightens many a hillside and bit of prairie, always showing a preference for sandy soil.

When the stalk emerges from the ground it wears a gray coat of silky hairs. Its tip is bent over and sheltered by large stipules (those leaf-like appendages at the base of each leaf-stalk), as if the plant hid its face between huge ear tabs from the sudden exposure to wind and sunshine. As the stem grows, the three-parted leaves push out from this protection, but for a time the leaflets remain folded along their mid-ribs, only gradually opening out and assuming the horizontal position. The flower buds are soon revealed, and rapidly develop into large, bright yellow, pea-shaped blossoms, followed a few weeks later by sickle-shaped pods.

It is interesting to observe the various and ingenious devices used by plants to ensure the safety of the tender young shoots and leaves during the great change from the snug cradle of the bud to the full exposure of maturity. The transition is usually made without injury. Many people believe that while man-made gardens are often caught by late frosts and storms, the wild plants have a sure instinct that leads them to defer growth until the weather is safe. But this is not wholly correct, "for only those who have studied nature but very little will maintain that she never errs."* The Golden Peas growing on a sunny slope near the house of the writer have been badly frozen three years out of six, while those near by, but on the north side of a coppice, have escaped all injury. These are no wiser than their brothers on the hillside, but the brush held the snow and frost and so delayed their start.

*Maeterlinck.



Golden Pea; Prairie Bean

FAIRY BELLS

Disporum trachycarpum S. Wats.

Lily Family

Here is no plant of the open prairie. The thin, soft tissue of it leaves and of its creamy-white flowers could not stand exposure to high wind, beating rain, or strong sunshine, hence it is in deep woods, especially on the sheltered sides of ravines, that this graceful and dainty beauty of early Spring is to be found. How well it chooses its home is shown by the fact that this photograph of perfect specimens was taken in the morning, after a late snowstorm, followed by frost, had bedraggled or blighted the hardier plants up in the open.

As the developing foliage of the trees shuts out more sunlight, the *Disporum* broadens out with the ample, horizontal leaves characteristic of woodland undergrowth. Still later in the season, each branch now widely divergent, bears one or two bright berries where once hung the delicate bells. These globose, three-lobed fruits are about one-half inch in diameter, and in process of ripening change from green to orange and then to dazzling scarlet. Their skin is minutely roughened, giving it the richness of velvet. Within is a small quantity of juicy pulp and numerous ivory-white seeds. The berries, although not likely to be used for human food, seen harmless enough. These are ripe before the leaves assume their autumn tints, so, unless carried away promptly by the birds, they have first a rich green and later a bright yellow background.

FAIRY BELLS

WILD SARSAPARILLA

Aralia nudicaulis L.

Ginseng Family

The Wild Sarsaparilla can hardly be called a beautiful flower, yet the plant as a whole is attractive, and, for a time in early June, its abundance makes it the most conspicuous feature of many a woodland from Newfoundland to British Columbia.

A long aromatic rootstock bears a very short stem, from a bud on which spring one leaf and one flower-stalk. Developing together the newly-expanded leaf overarches the newly-opened flowers. As will be seen by the picture, both are in threes. This is the usual number, although sometimes there are four main divisions to the leaf, and the umbels, or clusters of flowers, may vary from two to seven; if more than four, the extra umbels spring from one or more of the primary clusters, so giving a two-storied effect.

The small, greenish-white flowers seem to be followed by either a full crop of fruit or none at all. In 1919 the bloom was copious, but little fruit was produced; such plants, however, as had any berries bore full clusters, there being no half-filled ones. The berries are purplish-black or finally jet-black, rather sweet when first put in the mouth, but quickly turning bitter like quinine. They ripen late in the season, about the time the leaf turns a clear yellow.

The roots are supposed to have some medicinal value and there is a slight commercial demand for them. The official sarsaparilla, however, is from quite a different plant, the smilax of Central and South America.

Wild Sarsaparilla

EARLY PURPLE VIOLET

Viola nephrophylla Greene

Violet Family

Everyone knows and admires the violet, and with our admiration is combined a warmer feeling, for it is a lovable flower with a personal, almost human appeal.

Out of the two hundred or more species that have been described by botanists, Canada has her full share (whether with blue, purple, white, or yellow flowers), but none is finer than this one, which grows abundantly in wet meadows and beside ponds and streams from Quebec to British Columbia. The large, long-stemmed blossoms are a true violet in color, wonderfully deep and rich if seen when "violets bathe in the wet o' the morn." If, some dewy morning, it is your privilege to come upon a little pool, bordered with these Early Purple Violets, then you have indeed chanced upon one of the most exquisite of Nature's floral gems. You will notice the rich, suffused beauty of the violet faces. You will notice the tender green of the leaves, acting, by the contrast of their simple freshness, as a foil to intensify the blushing beauty of the violets which shyly peep forth above, bejewelled with wonderful, translucent pearls of dew-drops. The human appeal is so strong that one smiles in wondering if each violet face, peeping into the expectant waters of the pool is simply greeting, or studying awaking Nature. Or have we here simply the charming vanity of conscious beauty?

A remarkable fact, not generally known, is that violets have two kinds of flowers. The second kind are inconspicuous green or purple buds on short, often prostrate, stems. The buds do not open and yet they produce capsules full of seeds. When this was first noticed by botanists of the eighteenth century, it seemed such a wonder that they named that particular kind the Miracle Violet. It has since been found that with few exceptions all violets produce these cleistogamous flowers, as they are called. Self-fertilization in the bud is of course the explanation of the wonder.

EARLY PURPLE VIOLET

SHOOTING STAR; AMERICAN COWSLIP

Dodecatheon pauciflorum (Durand) Greene

Primrose Family

The Shooting Star is one of the most interesting and beautiful of our wild flowers, whether we consider in detail its form and color or its general effect on the June landscape. It grows in wet meadows and the bright blossoms dancing above the grass are a delightful sight. Even as with Wordsworth's daffodils—

"A poet could not but be gay,
In such a jocund company,"

and those of us who are not poets can also feel our hearts fill with pleasure and dance with the sprightly Shooting Stars. Although one may sometimes see ten thousand at a glance, they do not form a solid mass of color but are so scattered as to retain the effect of lightness and grace.

The habit of the plant is shown by the picture. From the smooth, light green leaves rise the scapes six to fifteen inches high, carrying in umbel-like clusters three to ten or more nodding flowers. With their reflexed and twisted corolla-lobes, they resemble their relative, the cyclamen, of the greenhouse, but are much more slender and dainty. The color is a bright purple, almost cerise, with the throat showing a pretty combination of white and yellow with an encircling wavy line, narrow but sharply defined, of dark purple. The stamens closely surround the slender style giving a tapering point to this quaint, winged blossom. A fragrance, as of hyacinths, completes the charm.

Shooting Star; American Cowslip

PURPLE MILK VETCH

Astragalus hypoglottis L.

Pea Family

This is one of the earlier and smaller of the milk vetches, of which many different kinds grow in Western Canada. Its stems are slender, rather weak, branched at the base, and from three to eight inches high. The flower clusters resemble clover-heads, while the leaves are reminiscent of those of the true vetch but are without the tendril. The pods are short, thick, and hairy.

The Purple Milk Vetch is common over a wide area, growing in the open or on the edge of thickets, in a variety of soils. It likes some moisture, and, among the grass in low meadows, makes a thrifty growth like that shown, almost natural size, in the picture; but the deep black loam of the prairie is for some reason not congenial. It may be noticed, however, that, where the grading of a road through such soil has in places removed the top layer, exposing the hard, poor-looking subsoil, the Purple Milk Vetch is often one of the plants that quickly and mysteriously covers the naked earth with verdure. How do plants, strangers to the immediate neighborhood, so promptly take possession? To attempt a full explanation would take many pages, and be beyond the scope of this little book. One is reminded of a sentence by Oliver Wendell Homes—

"Nay, there are certain patches of ground, which, having lain neglected for a time, Nature, who always has her pockets full of seeds, and holes in all her pockets, has covered with hungry plebian growths, which fight for life with each other, until some of them get broad-leaved and succulent, and you have a coarse vegetable tapestry which Raphael would not have disdained to spread over the foreground of his masterpiece."

Purple Milk Vetch

THE FOREST INVADING A PEAT BOG

Antagnostic Plant Societies

Here is a typical picture of one phase of the struggle that is constantly going on between different plant societies. The birch trees, supported by willows and alders, have established outposts in the bog, and the main forces of the forest are coming up to complete the conquest. The common bog plants are still holding their ground, but their leaves are no longer a healthy green, and their flowers are small and scattered. Evidently they cannot last many more years. Behind this victory of the forest over the bog is a long story concisely told by the late Prof. Geo. F. Atkinson of Cornell University in the following paragraphs:

"Many of the peat bogs were once small ponds or lakes. The peat moss and other plants which find shallow water a congenial place to grow in begin marching out from the edge of the water toward the centre of the pond. The stems of the peat die below and grow above. So in this way they build up a floor or platform in the water. The dead peat now in the water below does not thoroughly rot, as the leaves do in the moist ground of the forest, because the water shuts out the air. The partly dead stems of the moss pile up quite fast in making the platform, which sometimes is entirely composed of peat. Other plants may grow along with the peat. Their dead bodies also help to build up this floor beneath.

"The army of peat and other water plants continues to march out toward the centre of the pond, though slowly. Finally, in many cases, the line around the shore meets in the centre and the pond is filled up, the floor having been extended entirely across. But they keep on adding each year to the floor, raising it higher and higher, until it is high enough and dry enough for the marching armies of the dry land grasses, shrubs, and trees. At length a forest comes to stand on the floor built across the pond by the peat moss and the other members of its society."—*First Studies of Plant Life, Ginn and Company.*

The Forest Invading a Peat Bog

BAKED-APPLE BERRY; CLOUD-BERRY

Rubus Chamaemorus L.

Rose Family

One must go to a peat bog in early June to find this curious little raspberry in blossom. Springing from rootstocks creeping through the moss, the stems rise only a few inches high. They are neither woody nor prickly as are most raspberries, and bear two or three simple leaves instead of the usual divided ones. These leaves are plaited in the bud, and in process of expansion the underside, with firm, close ribbing, is first exposed. Slowly the ribs or veins lengthen and spread apart, and as they do so, the leaf settles to its proper position facing the sky, so that its millions of cells, each a tiny starch factory, may by the energy of the sunshine produce a full day's output. Strikingly handsome the leaves are, rich and deep in texture and color.

A single flower, like a little white rose, tops each stalk. There are two kinds, as may be seen in the picture, where the four centre ones bear clusters of stamens, while the two tall, outside plants have flowers with pistils only. The staminate blossoms soon shed their yellow dust, then shrivel up and that is the end of them; but the pistillate ones, if they have received the vitalizing touch of the pollen grains, develop into the pleasant berries which give the plant one of its popular names. Many fruits in ripening change from green through yellow to red at full maturity, but here the order is reversed, from green to red, then to yellow.

When stamens and pistils are produced by separate individuals, the plant is said to be dioecious. This habit makes sure of cross-fertilization, with its advantage of seeds endowed with superior vigor and adaptability. On the other hand, it is not an economical method as only about half the plants can produce seeds, hence most of the higher plants combine stamens and pistils in the same flower, but so arrange things that cross-fertilization is usually assured, or at least encouraged.

BAKED-APPLE BERRY; CLOUD-BERRY

ARCTIC RASPBERRY; ARCTIC BRAMBLE

Rubus arcticus L.

Rose Family

Many interesting plants not elsewhere found grow in bogs, for conditions of life in company with peat moss are so unusual that only plants of special structure and habits can endure or thrive. Among the commonest of these bog-dwellers are the Labrador tea, a low shrub with round clusters of white flowers and thick leaves, rusty woolly underneath, and the cranberry, with its slender creeping stems, firm, tiny leaves and dainty, pink flowers nodding an inch or two above the moss. Among the most curious are three carnivorous plants, the sundew, the butterwort (whose leaves catch and devour insects), and the pitcher-plant whose pitfalls are baited with honey above a slippery incline that sends unwary visitors to certain death below. Of the beautiful flowers might be mentioned the three-leaved Solomon's seal, the tall white bog orchis, and the pretty little raspberry shown natural size on the opposite page.

Like the Baked-apple Berry, the Arctic Raspberry is herbaceous and unarmed, but more slender and with thinner three-foliolate leaves. The season of bloom is a week or ten days later, the flowers being pink or rose-colored and delightfully fragrant. As these are usually perfect, that is, have both stamens and pistils, they each produce a berry, bright red and of good flavor. The Arctic Raspberry likes a little shade, and is at home in wet mossy woods as well as in open bogs.

Although its name suggests the polar regions, it is sometimes found far south in Canadian territory.

ARCTIC RASPBERRY; ARCTIC BRAMBLE

WATER ARUM; WILD CALLA

Calla palustris L.

Arum Family

"Yes, though you may think me perverse, if it were proposed to me to dwell in the neighborhood of the most beautiful garden that ever human art contrived, or else of a Dismal Swamp, I should certainly decide for the swamp."—Thoreau.

If you feel in any measure the fascination of these so-called waste places, as did the philosopher of Walden, you will some day in your rambles come upon a colony of Water Arums. It is likely to be in a little pool in the bog or on the margin of the swamp. The dark masses of smooth, heart-shaped leaves should serve as identification. If in doubt, look for long, creeping rootstocks, with white fibrous roots at the joints. If not yet satisfied, break a rootstalk and taste the juice, but very delicately, for it has an acrid bite. In early Summer the flowers make such experiments unnecessary, as you at once recognize a humble relation of the stately calla lily of the greenhouse.

The flowers proper are small, consisting of stamens and pistil only, and are compactly arranged around the top of the stem into a fleshy spike, called the spadix. Below this is a thick, pointed bract, the spathe, white on the inner surface, greenish on the outside. This snowy banner behind the inconspicuous spike serves to attract insects, who unconsciously aid in fertilization as they crawl over the flowers and pass from plant to plant. By late Summer the spadix has developed into a large, knotty head of bright red berries, containing hard, smooth seeds surrounded by a jelly-like pulp.

WATER ARUM; WILD CALLA

SILVER-WEED; SILVER-FEATHER

Potentilla Anserina L.

Rose Family

The Silver-weed has a cheerful and active disposition, readily adapting itself to a variety of conditions, and quickly grasping opportunities for advancing its fortunes. Preferring wet ground, yet making the most of dry, it has occupied so much territory that its neat silver-green uniform is well known from Newfoundland and New Jersey to Alaska and California. While its behavior at times is such as to class it with the weeds, it certainly is not pernicious.

Silver-feather is a better name because of its plume-like leaves, silvered beneath by long, silky hairs and usually green on top. Sometimes, however, the upper surface has also a thin, silky covering. This variation with its cause is nicely shown by two patches beside the house of the writer. One is close to the foundation on the south side in poor soil, exposed to full sunlight, and the leaves are gray green. The other is on the west side in rich loam, getting no sun until after eleven o'clock, and here the upper surface is bright green.

The yellow flowers are produced over a long season, as they spring from the axils of small leaves on the strawberry-like runners sent out in profusion. These runners are usually from one to three feet long, and from them new plants start every few inches. A mat of vegetation is soon formed. In producing and directing their runners, the plants exhibit something very like intelligence, as the following instance will show. On the shore of a little lake in 1919 grew a vigorous Silver-weed. The dry season lowered the water until a strip of sandy bottom eight feet wide was exposed. The plant was crowded behind and on either side by competing neighbors, but in front lay this land of promise, so, with concentrated energy, a single runner was pushed out straight towards it. By the twenty-fourth of August an advance of over five feet had been made, and eighteen young plants established on the line of march were aiding the parent in its forward movement.

SILVER-WEED; SILVER-FEATHER

ROUND-LEAVED ORCHIS

Orchis rotundifolia Pursh

Orchid Family

Although not one of our rarest or showiest orchids, this one is pretty enough, and in most districts uncommon enough, to make its discovery a happy event to the lover of flowers. Some years ago, in October, I found a few dried stems with empty seed cases at the top and a withered leaf at the base of each, and recognized an old acquaintance not met with for fifteen years. My eagerness took me back too early the next June, but on a second visit, the two or three dozen plants were in full bloom. This small colony has flourished and spread along the little waterway, and last Summer several hundred flower-spikes were produced—a sight worth going far to see, and a natural garden worth preserving.

The Round-leaved Orchis lives in rich, moist woods, often where the ground is covered with moss, from which, leaving its single leaf behind, the flowers rise in crisp, glistening purity to a height of about six inches. They are white, delicately tinted pink with a suggestion of mauve. The upper sepal and two petals form a hood, and under it stands the column, a structure peculiar to the orchid family, in which are combined the organs corresponding to stamens and pistil in other flowers. On either side are wing-like sepals, while in front, the third petal spreads out into a purple-spotted lip or apron, and below is a curved tube containing nectar. The hood protects the column, the essential part of the flower, the lip is the landing stage for the winged guest, who finding in front of him the opening into the nectary, thrusts in his tongue, thus bringing his head against the adhesive ends of the two pollen masses. When he flies away to the next flower he of course carries the pollen along.

The wonderful interrelationship in form and service that exists between flowers and insects, suggested in the above description, is nowhere carried to such a specialized degree as in the orchid family.

ROUND-LEAVED ORCHIS

BLUE BEARD-TONGUE

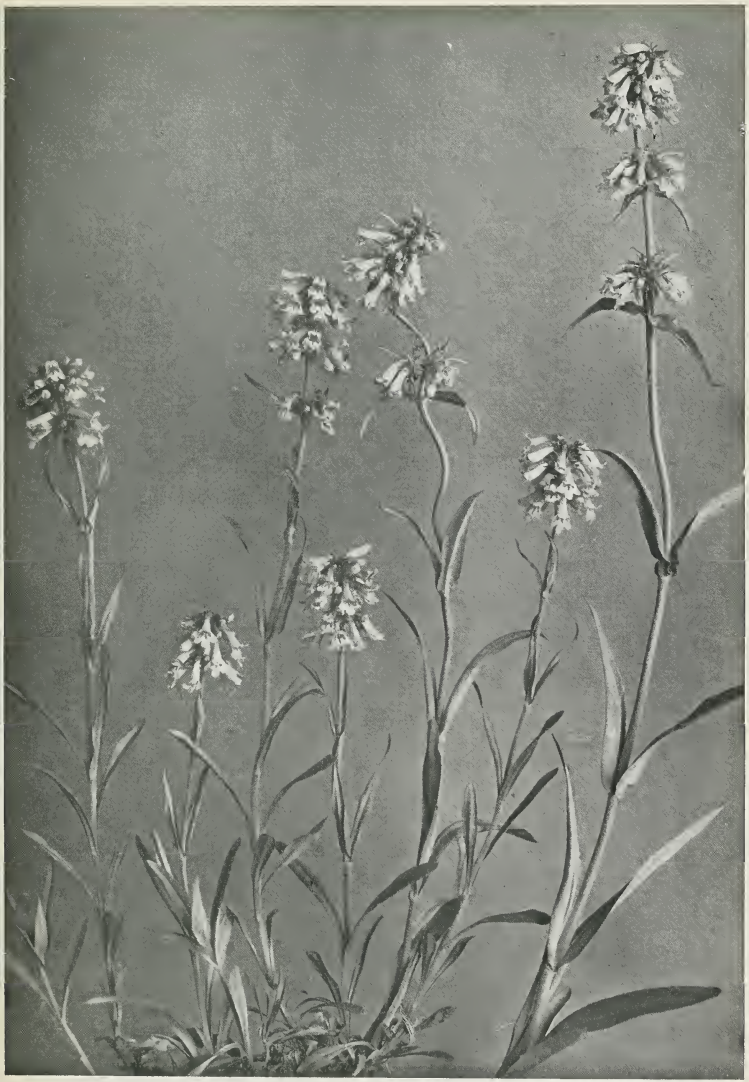
Pentstemon procerus Dougl.

Figwort Family

The Penstemons hold an important place in the flora of Western America. Dr. Rydberg describes ninety-seven species of which at least a score are found in Canada. They are perennial herbs found for the most part on dry plains and hillsides. Their stems, which branch from the base only, bear opposite leaves and terminal clusters of showy blue, purple, yellow, or white flowers. The corolla is irregular with a long tube and two spreading lips. Four stamens are anther-bearing, but the fifth is sterile and usually densely hairy, giving to the plant its curious but appropriate name of Beard-tongue.

This particular species—the Blue Beard-tongue—is characteristic of the southern part of our territory but strays northward in places. The clustered stems are from four to twelve inches high and usually quite smooth as are also the leaves. The crowded flowers are smaller than those of most beard-tongues and are dark purplish-blue of such a distinctive shade that once seen, it thereafter serves as a means of indentification.

Color, however, is not always constant enough to be a safe guide. Blue and purple flowers are especially subject to variation, and among such plants as the bluebells, blue asters, bergamots, and great willow-herb, lighter shades than normal are common, and even albinos may occasionally be found. Delicate shades of pink and mauve are quite inconstant, and the brilliant pink, rose, or red of the painted cup seems to change with each variation of soil or exposure. Yellow is much more stable, and, although we have many yellow-flowered plants, each has its own particular tone, or its own particular way of bearing its flowers, even its own way of forming groups or masses. Hence, by means of the color and the disposition of the color masses, a close observer can usually recognize a plant while he is still too far away to distinguish the form of either flower or leaf. Yet even the yellows will sometimes prove misleading.



Blue Beard-tongue

BIRD'S-EYE OR MEALY PRIMROSE

Primula farinosa L.

PRIMROSE FAMILY

The primrose, like the violet, has ever been a favorite with the poets. Shakespeare, Burns, Wordsworth, and many others have sung its praises. One who has rambled in the woods and along the lanes and hedgerows of England in early Spring can understand what a large place the primrose holds in the life and literature of the people.

But the Bird's-eye Primrose, although widely distributed and often abundant, will never take the place in Canada that its yellow namesake holds in the Old Land. It is too shy, and so unassertive in color and habit that it is often walked over without being seen. It grows in wet meadows and is usually half hidden among the grass. Of this Primrose, as of the walking-fern, it may be said that no one ever found it, unless it was first in his heart. Still, observation can be assisted to locate it. For instance, the Shooting Star and this Primrose frequently grow together, so that the gaudy flowers of the former may readily help one to find its pretty but retiring relative.*

Ah! here are a few, on tip-toe, as it were, to peep over the surrounding damp sedge. Pluck one and notice the corolla, pale lilac in color, with a yellow eye. And the leaves! Notice how they are tufted at the roots, of a pale green color on the upper side, and covered on the under side with a fine white down which gives a white mealy effect. This white down also creeps up to cover the flower-stem which is from four to fifteen inches high. The whole color effect is in harmony with the surroundings, whilst yet leaving the flower with a modest distinction.

*It should be said that while their periods of bloom overlap, the Shooting Star opens first by a week or two.

Bird's-eye or Mealy Primrose

MARSH RAGWORT

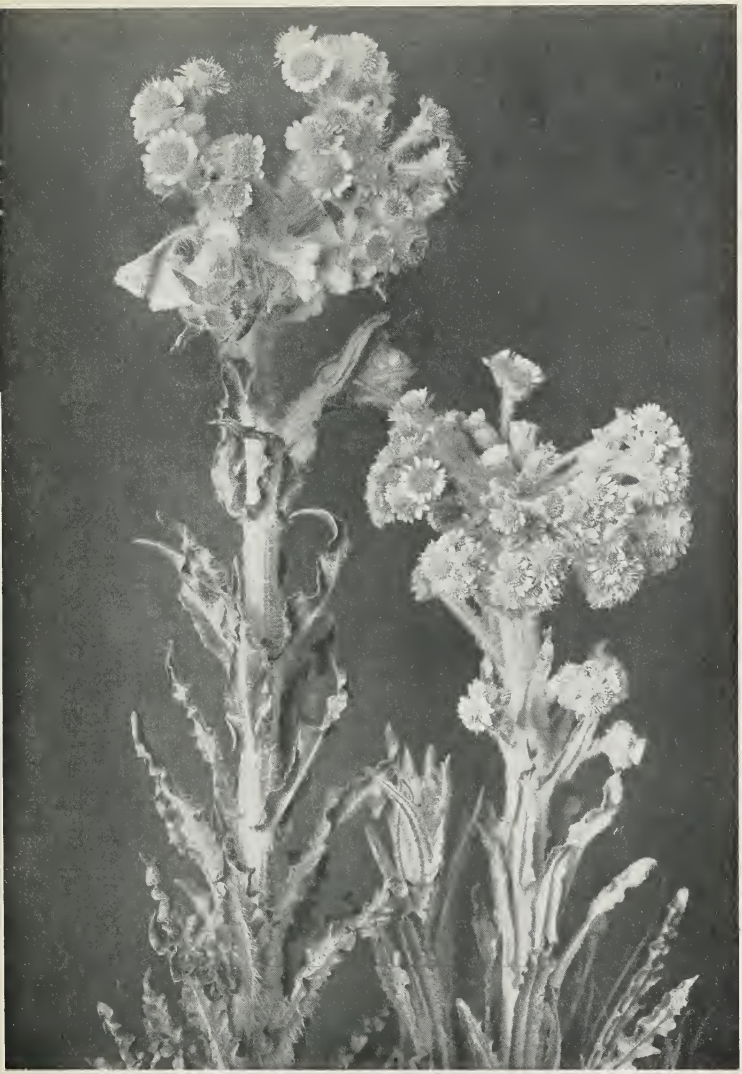
Senecio Palustris (L.) Hook.

Thistle Family

The March Ragwort belongs to the great family of the *Compositae* which numbers over ten thousand species in all parts of the earth. In Western Canada, beginning in early Spring with the sweet coltsfoot, the family increases in importance as the season advances until late in Summer the sunflowers, daisies, asters, goldenrods, and other members of the family quite dominate the floral world.

The flowers differ from those of other families being borne many together in a compact head surrounded by bracts. In this subdivision of the family the flowers are of two kinds, the disk florets, small, tubular, and crowded, in the centre; and the ray florets, more or less strap-shaped and spreading outward to form a kind of aureole. On account of its great size the Russian sunflower is a good composite to study first.

Coming back to the March Ragwort, we notice that it is a stout, hairy plant. The stems are eight to forty inches high, the bigger ones as thick as a broom handle. All are hollow, with no cross partitions from just above the root to the flower branches. The outside of the grooved stem and the veins of the wavy-edged leaves are often thickly covered with white cobwebby hairs which, seen through a hand lens, look as if spun from clear glass. The infloresence is at first compact, but soon opens out in a rather ragged way. The disks are yellowish, and the short broad rays are light yellow. After flowering, the heads turn down and remain in that position until the seed is ripe, when they straighten up again. As with many other members of the family, each seed is furnished with a tuft of white hair that acts as a parachute to float it away on the breeze.



Marsh Ragwort

ZONES OF VEGETATION AROUND A POND

Marsh Ragwort forming the first belt thirty feet wide

Such a pond as this is a good place to study plant societies, both congenial and antagonistic. Some plants live together in peace, sharing space, food, and water, and in various ways being mutually helpful; others wage war on their neighbors, the success of one bringing disaster to competitors. The character of the season has a large share in determining with whom victory shall rest.

The year 1919, or perhaps the Fall of 1918, seemed to favor the Marsh Ragwort which is usually a Winter annual. In many places it was more in evidence than usual, but nowhere have I seen a more complete triumph over competing vegetation than it won around this particular pond. In the zone suited to it, every foot of space was occupied to the exclusion of all else. Behind the ragworts was a fairly solid belt of the great bulrush. Back of this were coarse grasses and sedges, among which, however, the northern green orchis, the skullcap, mint, knotweed, and other plants were thriving. On still higher ground the willows dominated, as did the poplars on the low ridge in the background.

By mid-August the water was gone and the mud beginning to dry and crack. The portion of the pond bottom that shows as a mud bar in the picture was densely carpeted with young ragworts six inches high. In the deeper parts, where the water remained longest, and among the dead stems of the parent plants, seedlings were breaking ground in countless numbers, hence the ragworts bid fair to repeat their triumph next year. We may wish them good luck, for they stay in their own place, do not march up on to higher land to choke out the farmer's crops, and in June transform their portion of the landscape into a veritable "Field of the Cloth of Gold."

Zones of Vegetation Around a Pond

TALL LUNGWORT; BLUEBELLS

Mertensia paniculata (Ait.) G. Don

Borage Family

Although many members of the Borage family are rough, hairy herbs of weedy aspect, others are of marked beauty and refinement. Among the latter might be mentioned the vanilla-scented heliotrope of the greenhouses, and the forget-me-not which beautifies alike lonely mountain streams and formal city gardens. But the finest of the family and perhaps the loveliest of all blue wild flowers in Canada is the Virginian cowslip (*Mertensia virginica*). It, however, is found only in Southern Ontario and is rare even there, while this western Mertensia is widely distributed and abundant, no other blue flower of early Summer being so conspicuous in many districts.

The picture shows the plant much reduced in size, as the stems grow from one to three feet high. They bear open clusters of drooping flowers which are pink when in bud, turning rich blue as they open. The dark green leaves, especially those at the base of the stem, are strongly and handsomely veined.

In open meadows, where it sometimes grows, this Lungwort is rather stiff and quite hairy; in shade and along streams it becomes smoother, taller, and more graceful; while among bushes on mountain slopes, high enough to be frequently bathed in mist, it may be seen in such perfection as to rival its lovely eastern relative.

TALL LUNGWORT; BLUEBELLS

YELLOW LADY'S SLIPPER

Cypripedium parviflorum Salisb.

Orchid Family

The orchids, the aristocrats of the floral world, form a large family, with family seat, as it were, in the tropics and scions in almost all parts of the earth. Some of them, especially those that grow as airplants on tl bark of trees in hot, moist forests, produce flowers weird and fantastic, or marvelously beautiful, beyond imagination. Thousands of species have been found by collectors who risked, and sometimes lost, their lives in the search. Sent home to Europe or America, these dormant plants have been purchased by orchid enthusiasts in whose hothouses under skilful and devoted care they bloom again in wondrous diversity of form and color.

Our Canadian orchids are all land plants, and while a number have small, inconspicuous flowers, interesting chiefly because of their structure and family relationship, a dozen or so are of such beauty and distinction that they would be noticed in any company. Of such is the Yellow Lady's Slipper pictured here.

The inflated lip or slipper is deep yellow, and the other parts are yellowish-green, often striped or shaded with dark purple. The long, narrow side petals are usually twisted or curled, enhancing the charm of these strange flowers, which are so poised that in a breeze they seem animate, expectant, ready for eager flight.

This orchid, growing in open woods and thickets and blooming in June, was at one time comparatively common in many parts of Canada, but advancing civilization is destructive of native life, and they are becoming rarer each year. The remaining ones should be preserved as far as possible or this splendid plant is likely to be exterminated.

Yellow Lady's Slipper

TWIN-FLOWER

Linnaea borealis var. americana Rehder

Honeysuckle Family

"He saw beneath dim aisles, in odorous beds,
The slight Linnaea hang its twin-born heads,
And blessed the monument of the man of flowers,
Which breathes his sweet fame through the northern bowers."
—Emerson.

This dainty, trailing vine with small, evergreen leaves and fragrant, pink flowers was a favorite of Linnaeus, the great Swedish botanist of the eighteenth century, in whose honor it is named.

In Canada it occurs from ocean to ocean and from the Arctic to the international boundary. It is likely to be found in woods surrounding bogs, on the shady side of ravines, and in any cool, moist forest. It is especially at home in the mountains, and many readers will remember how delightfully some of the woodland trails at Banff, Lake Louise, and Jasper are bordered with its "odorous beds." Spring comes first to the valleys and travels slowly up the mountain sides, so if the visitor be too late for it at the lower altitudes he need only do a little climbing. Late in July on a mountain slope at Jasper Park I saw, not patches only, but a vast, continuous carpet stretching away for miles. As we went up through the lodgepole pines, the first plants met with were in seed; a few hundred feet higher some belated flowers were seen; still higher, bloom was at its best, tinting the floor of the rather open forest as far as one could see. The slender, leafy vines crept over and through the fallen needles, weaving a ground covering of pale green over which shimmered a delicate rosy-tinted light caused by the millions of little pink bells, each a minute censer filling the air with delicious and delicate perfume.

" 'Neath cloistered boughs, each floral bell that swingeth
And tolls its perfume on the passing air,
Makes Sabbath in the fields, and ever ringeth
A call to prayer."—Horace Smith.

TWIN-FLOWER

BUNCHBERRY; DWARF CORNEL

Cornus canadensis L.

Dogwood Family

The Dogwood family is represented in Canada by many handsome shrubs and trees. The most famous of the latter group are the two flowering dogwoods, one species found in Southern Ontario and the other on the Pacific Coast. These trees, when covered in Spring with clouds of large white blossoms and in Autumn with brilliant foliage and bright red berries, are the most splendid ornaments of the woodlands where they occur. Owing to their limited range, however, these flowering dogwoods are known to comparatively few Canadians.

But the Dwarf Cornel, the pigmy of the family, is common in cool, damp woods from coast to coast. Its floral arrangement is like that of its two big relatives. The true flowers are small and greenish, in a compact head surrounded by four white, petal-like bracts. Each flower-head springs from the centre of a whorl of broad, strongly-ribbed leaves, borne at the summit of a stem from three to eight inches high. The stems are produced freely from creeping underground rootstocks and sometimes dense patches are formed. A stretch of forest floor carpeted with these handsome leaves, studded with four-pointed stars, is a pretty sight.

The flowers fade, and are succeeded by berries in the close bunches which give to the plant one of its common names. In late Summer, therefore, the green carpet is again brightened, this time with coral-red fruit clusters. A little later, the leaves assume the rich crimson shades characteristic of dogwood foliage Even against this gorgeous background the berries stand out clearly. When the sunlight flickers through the autumn woods on this final stage in the Bunchberry development it lights up a scene so warm and glowing that memory recalls it with pleasure in the gray days of Winter.

BUNCHBERRY; DWARF CORNEL

YELLOW COLUMBINE

Aquilegia flavescens S. Wats.

Crowfoot Family

"One sometimes seems to discover a familiar wild flower anew by coming upon it in some peculiar and striking situation. Our columbine is at all times and in all places one of the most exquisitely beautiful of flowers: yet one spring day, when I saw it growing out of a small seam on the face of a great lichen-covered wall or rock, where no soil or mould was visible,—a jet of foliage and color shooting out of a black line on the face of a perpendicular mountain wall and rising up like a tiny fountain, its drops turning to flame-colored jewels that hung and danced in the air against the gray rocky surface,—its beauty became something magical and audacious."

—John Burroughs.

Mr. Burroughs, in the fine descriptive passage quoted above, refers to the Wild Columbine (*Aquilegia canadensis*) with gay scarlet and yellow flowers, the common species in Eastern Canada, but with its western range limited, perhaps, to Manitoba. Our illustration is of the Yellow Columbine, found chiefly in the mountains and foothills. The sepals of this nodding flower are spreading and wing-like, sometimes pale yellow, but frequently flushed more or less with crimson. The cream-colored petals are concave and spurred, five horns of honey in a circle, from the centre of which projects a cluster of yellow stamens. Very graceful in form and foliage, as well as dainty in coloring, is this Yellow Columbine.

Among the foothills, and extending its range eastward in open woods and meadows, grows the Small-flowered Columbine. The neat little flowers of this species have blue sepals, white short-spurred petals and short stamens which do not form a projecting tassel as in the Yellow Columbine.

The spurs of these quaint anl lovely blossoms contain nectar that can be reached only by long-tongued bees or by butterfies, who pay for the feast by carrying pollen from flower to flower. Sometimes, however, one may find a columbine in which some insect, unable to reach the nectar in a legitimate way, has eaten or bored a hole in the bottom of the spur. Such back-entrance robbery is not confined to the columbine. Other plants also suffer from it occasionally, but usually the designs of insect marauders are frustrated by a sticky flower stem, a brisly calyx, a bitter juice in the tissue of the corolla, or by some other device.

YELLOW COLUMBINE

NORTHERN BEDSTRAW

Galium boreale L.

Madder Family

The Northern Bedstraw is a common plant from Quebec to Alaska and southward across the international boundary. But it is most abundant and reaches its highest floral development in the northern part of its range, blooming over quite an extended period in June and July. Woods and thickets, gravelly roadsides, railway embankments, and rocky hillsides are made beautiful by its light clouds of tiny four-parted blossoms, and the passing air is sweetened by its fragrant breath. Wild Baby's Breath would seem to be a more appropriate name for this dainty flower.

In the woods the Northern Bedstraw grows thirty inches high with large, open panicles of white flowers. In the open the height is reduced to eighteen inches or less, the stems are stouter and more erect, and the flower clusters more compact. The plants pictured on the opposite page grew in dry soil in full sunshine, and were fifteen inches high. It will be noticed that the stems are square, and the narrow leaves borne in fours. The flowers are followed by small bristly-hairy burrs.

Several other kinds of bedstraws are found in Canada. All have small, often inconspicuous flowers, and all have their leaves arranged in whorls of four to eight. The stems of the Sweet-scented Bedstraw—a woodland species with leaves in sixes and greenish flowers in threes—are soft and weak, and when dried make a comfortable and fragrant camp bed. Other weak-stemmed species are usually furnished with stiff, deflexed hairs or bristles on the angles of their stems and on the edges and midveins of their leaves to enable them to scramble over stronger neighbors. The burrs of many species have hooked bristles which cling to passing animals or men, and in this way they become widely distributed.

Northern Bedstraw

SENECA SNAKEROOT

Polygala Senega L.

Milkwort Family

The Seneca Snakeroot is found in dry or rocky soil from New Brunswick to Alberta. It seems to be equally at home in open woods, among thickets, or on the plains. If supplied with shade and sufficient moisture, it may reach a height of sixteen inches. On the other hand, in full sunshine and dry soil it seems also to prosper, but may be only one-quarter as tall.

The clustered stems rise from a thick, hard, and knotty root-stock. The lower part of the stem—the part hidden in the grass—is purple in color, and here the leaves are reduced to scales. The ordinary leaf is remarkably uniform in size and shape, smooth except on the edges, and with a prominent midvein. The white flowers, borne in a terminal spike, are irregular in form. Two of the five sepals are white and petal like, and are called wings. Of the three petals, the lower and larger one—concave and crested—is called the keel. The flowers never open widely, and most of the time are closed, giving the flower-spike the appearance of being always in bud. The whole aspect of this little plant is neat and attractive, and although it is not at all showy its discovery always gives pleasure.

The name Polygala is from the Greek meaning "much milk." It was applied from a belief that the eating of it by cows increased the secretion of the lactic fluid. Some of the other species may be partaken of by cattle, but this one does not seem to be eaten. The roots, however, although no longer considered to be a remedy for snakebite, have some medicinal value, and there is a limited commercial demand for them.

Seneca Snakeroot

RED LILY; WOOD LILY

Lilium montanum A. Nels.

Lily Family

The Red Lily, in slightly different forms, is common in many districts from Ontario to Alberta. It grows in open woods, among bushes, and along roadsides in rather dry soil. Usually each leafy stem is crowned by a single red, or orange-red flower, although vigorous plants may produce two, three, or even five in a cluster.

Admired for its beauty, and easily found because of its large size and vivid color, the Red Lily is eagerly gathered. In rural homes and schools it may be seen in great bunches packed into vases, cans, or pails. Town and city dwellers returning from an evening's run into the country or from a First of July excursion have their arms, one might almost say their cars, filled with the bright blossoms. The country for miles around is stripped. Those who gaily picked them had probably a hazy idea that wild flowers just happen, and in some way will always happen. But into the flower the plant puts its supreme effort, an effort that leaves the roots lax and depleted. Their energy can be restored only by the work of the leaves during the Summer. These Lilies and many other flowers are pulled up or broken off with all their leaves attached, hence the roots in their weakened condition either die or at best require several years to regain strength enough to produce more flowers.

The beautiful wild flowers are the culmination of Nature's efforts applied to plant life through millions of years. They should be the heritage of mankind for all time, but the choicest are in danger of disappearing in a single generation. We have learned to hunt song-birds with field-glass and camera instead of a gun. Let us learn to enjoy wild flowers where they grow. Each has a life story well worth reading, legible to the patient and sympathetic observer.

Red Lily; Wood Lily

IN A WESTERN WOODLAND

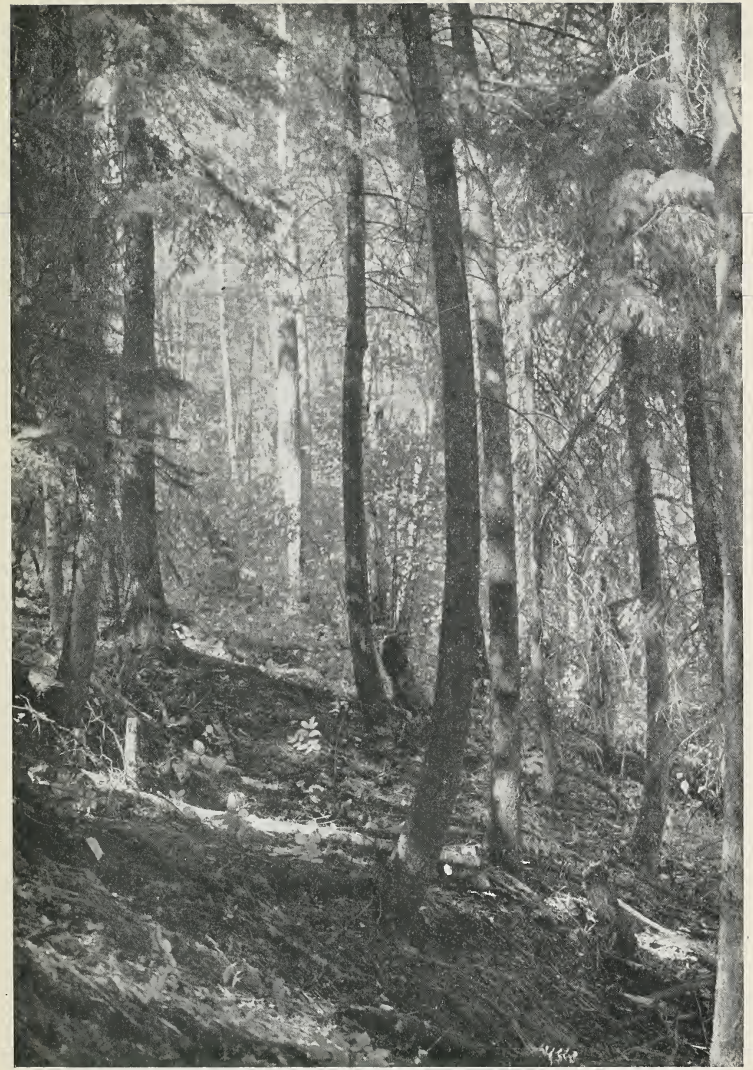
". . . . . Nestled at his root
Is beauty such as blooms not in the glare
Of the broad sun. That delicate forest flower
With scented breath, and look so like a smile,
Seems as it issues from the shapeless mould,
An emanation of the indwelling Life."

A Forest Hymn—Bryant.

Something there is in the perspective of a woodland glade that has a tranquilizing and restorative effect upon the mind. Analysis would but destroy the charm. And yet, just as one is here aware of a different mental attitude when "far from the madding crowd's ignoble strife," so one must notice the special appeal made by woodland flowers. Usually they are smoother and broader of leaf, more delicately colored, and generally more graceful than their kinsmen of the plains. Nor is variety of plant societies lacking. In mixed woods especially, a few steps may take one readily from one type of vegetation to another, the determining factors of the change, of course, being the amount of sunshine finding its way through the foliage and the amount of moisture in the soil.

In the picture opposite, showing the sloping bank of a wooded ravine, we have in the foreground a rather compact group of spruce trees, and beyond the sunlit aspen forest. In the dense coniferous shade grow mosses and lichens in abundance but flowering plants are few. We may find, however, an odd specimen of the wild sarsaparilla, of the green-flowered wintergreen, the one-sided wintergreen, and small clusters of that curious saprophytic orchid, the early coral-root—a plant without leaves, just pale stems bearing small flowers mottled with dull white, yellow, and purple. Moving out into the lighter shade on the edge of the spruce grove we notice flowers of cleaner and brighter colors—the pink wintergreen, the dwarf cornel, the fairy bell, and the twin-flower. Under an overhanging bank are lovely soft beds of the oak fern, and lower down a few scattered fronds of the brittle fern. In the more open poplar woods grow columbines, geraniums, Canada violets, lungworts, and nodding onions. Going down near the brook, in still more open spaces, we find anemones, fleabanes, and jewel-weeds. In the stream itself are beds of the dainty blue speedwell.

This list of plants, although by no means complete, will give the reader some idea of the flowers to be found in such a wooded ravine almost anywhere throughout that vast irregular region, stretching from Manitoba to the Rocky Mountains, and lying between the open prairie and the great sub-arctic forest.



In a Western Woodland

PINK WINTERGREEN

Pyrola asarifolia Michx.

Heath Family

Our woods in early Spring lack many a delicate forest flower that some of us knew and loved in the East. We do not have the frequent April showers that bring forth May flowers. After the first flush, heralding its advance, the floral pageant seems sometimes to halt and mark time, waiting for the Summer rains. Meanwhile, the days lengthen, until only a few hours of darkness remain. Then comes the rain with its almost miraculous quickening of vegetable life. Verdure flows over the prairies, up the hills, and into the woods, quickly followed by successive waves of gay color. In the lighter aspen shade there are more flowers than beneath the heavier foliage of the hardwood forest, and our midsummer woods are adorned with many bright blossoms. None is more ornamental than the Pink Wintergreen which grows in great profusion in rich, damp woodlands and thickets throughout our territory.

In late June or early July, from the circle of thick, shining, evergreen leaves, rises a slender stem, five to twelve inches high, bearing numerous nodding flowers, each with a curved and protruding style. The petals are softly shaded from pale pink in the centre to deep rose on the edges. When a fragrance like that of the cultivated lily-of-the-valley is combined with such beauty of form and color it perfects a plant of rare loveliness.

The large buds, from which the flower-stalks sprung, were fully formed during the previous Summer. All parts were there —stem, calyx, corolla, stamens, pistil—beautifully formed in miniature, each separate flower-bud packed away beneath its own scale, and the whole enclosed by a few larger red scales. In this condition, with perhaps a light blanket of leaves, they were exposed to zero weather before the snow came as additional protection.

This careful preparation of parts in miniature, so beautifully exhibited by the Pink Wintergreen, can be traced, in varying degrees, in other plants, and, generally speaking, accounts for the rapid development of vegetation when the quickening breath of Spring begins to loosen the hold of Winter.

Pink Wintergreen

ONE-FLOWERED WINTERGREEN; SINGLE BEAUTY

Moneses uniflora (L.) Gray.

Heath Family

The name Moneses is derived from Greek words meaning "single delight" and is surely appropriate. Many flower lovers consider this our most beautiful wild flower, and the finding of a colony in bloom in the mossy spruce woods is the laying up of a treasure in memory. Such a pleasure is within the reach of many, for the plant is widely distributed, although not as common as the Pink Wintergreen. These glistening, waxy blossoms with crisped edges, are usually white, but are said to be occasionally rose-colored. They are shown natural size in the picture opposite.

This little plant is prudent as well as fair. Its chief purpose is to produce seeds, and send them forth with a good chance of success in life. The vitality that comes from cross-fertilization is highly desirable, and in the early stage of bloom, the pendent position of the flower with the relative arrangement of pistil and stamens gives visiting insects every chance to carry pollen from one flower to another, and also prevents self-fertilization. But even self-fertilized seeds are better than none, hence in the later stage, to make assurance doubly sure, the face of the flower is tilted upward, even when cross-fertilization has already taken place, giving the style an oblique postion and bringing some of the anthers directly above the five-lobed stigma. These anthers open by pores at one end, and the curve of their stalk of filament is now changed so that the pores point downward, and the pollen remaining in the sacks is shaken out upon the stigma below. Thus fertilization is doubly provided for—surely a happy instance of the attempt by the individual plant to carry on and extend the species.

ONE-FLOWERED WINTERGREEN; SINGLE BEAUTY

PURPLE GERANIUM OR CRANE'S-BILL

Geranium incisum Nutt.

Geranium Family

Several Geraniums with comparatively large flowers—three-quarters of an inch or so in diameter—occur in Western Canada. The Spotted Geranium, the common form in Eastern Canada has apparently not found its way westward beyond Manitoba. However, it is replaced by at least two handsome species—Richardson's Geranium, with its thin leaves and delicate white flowers, found chiefly in woods and thickets; and this Purple Geranium, a more hairy and rugged plant, with bright purple flowers, found in open meadows as well as in shaded places. Both grow to a height of two feet or more, and bloom from late June until August. In both, the leaves contribute not a little to the attractiveness of the plant.

After the petals have fallen, the seed vessels develop in such a way as to give these plants the name of Crane's-bill. The five carpels or seed-pods, growing in a ring, suggest, remotely, the head of a bird, and the stout column, which rises from their centre, suggests the beak of a crane. This column consists of a central five-angled axis with which are combined five stout bristles, each one of which is produced up from, and forms a part of, one of the five seed-pods. As the seeds ripen, the column dries unevenly and in such a way that there is a great tension in each bristle. This tension is ever increasing until the seed-pod suddenly breaks away at its base. The bristle, coiling upward with great force, acts as a spring to fling the seed a considerable distance from the parent plant. After the explosion the empty cases hang from the top of the column's axis in a pretty chandelier-like group.

On a dry, warm day it is interesting to watch the operation of this novel process of seed distribution. If the observer be pressed for time or lacking in patience he may hasten its action, for a touch will often spring the mechanism of this vegetable catapult

Purple Geranium or Crane's-Bill

TALL WHITE CINQUEFOIL

Potentilla arguta Pursh

Rose Family

The Cinquefoils are ubiquitous in Western Canada. On the rocky summits of mountains grow low, tufted forms, starred with short-stemmed blossoms. In moist and fertile meadows in the deep valleys they flourish in variety, reaching a height of three feet or more. On the dry plains, by clothing themselves in dense hair or wool, they endure successfully scorching sun and wind. In swamps and peat bogs the marsh cinquefoil with its curious dark red flowers is a common sight. Along brooks and fences, among piles of rubbish, and in cultivated ground one will everywhere find cinquefoils. Some two score species are scattered over Manitoba, Saskatchewan, and Alberta. The great majority have yellow flowers and all have compound leaves. The leaflets vary in number from three to thirteen, but as five is common, the name, cinquefoil, has been applied to all.

The Tall White Cinquefoil impresses one as being a rather handsome plant of gentlemanly attitude. Its strawberry-like blossoms are commonplace enough, its general aspect is not very different from some of its weedy kinsfolk, yet it has an air of distinction. Trying to analyse the cause we notice that the stems are tall, erect, and moderately slender, that the leaves are well-shaped, neatly veined, and evenly covered with somewhat glandular hairs, that the flower clusters are compact and the blossoms close-set, and that there is a certain dignified reserve about the whole plant. It does not take advantage of superior height to thrust its elbows into the faces of its neighbors, and it sends out no runners to seize adjoining land. Yet the Tall White Cinquefoil gets on very welli n the world, and may frequently be met with in dry meadows and thickets throughout the whole breadth of our territory.

Tall White Cinquefoil

COW PARSNIP

Heracleum lanatum Michx.

Carrot Family

This lusty perennial of decorative character is widely distributed, from Newfoundland to Alaska, and south from North Carolina to California, but reaching its greatest profusion in the North where one of the rivers is named "The Parsnip" because of the abundance of the growth of this plant on its banks. In the open it grows three or four feet high, and almost as many wide, while in moist, shaded places it stretches up eight feet. It prefers damp soil, as its broad leaf-surfaces indicate. The hollows in these, caused by the waved and curled edges, the shallow channels on the stalks of the lower leaves, and the inflated sheaths on the upper ones, aid in catching rain and conveying it down the stem to the cluster of fleshy roots.

The white flowers, opening in June and July, are borne in great umbels sometimes a foot across. The outer petals of the outside flowers are enlarged, spreading out where they find room, so making the whole head more conspicuous. Such massing of many minute flowers, in various forms, is common among plants and adds to their beauty and efficiency. In the one under consideration, the large, honey-laden expanse of white attracts many insects, and the flat clusters afford a firm and ample feeding platform for these guests. In return they carry the pollen from one flower to another, and from plant to plant, so bringing about the cross-fertilization necessary to maintain the vigor of successive generations.

COW PARSNIP

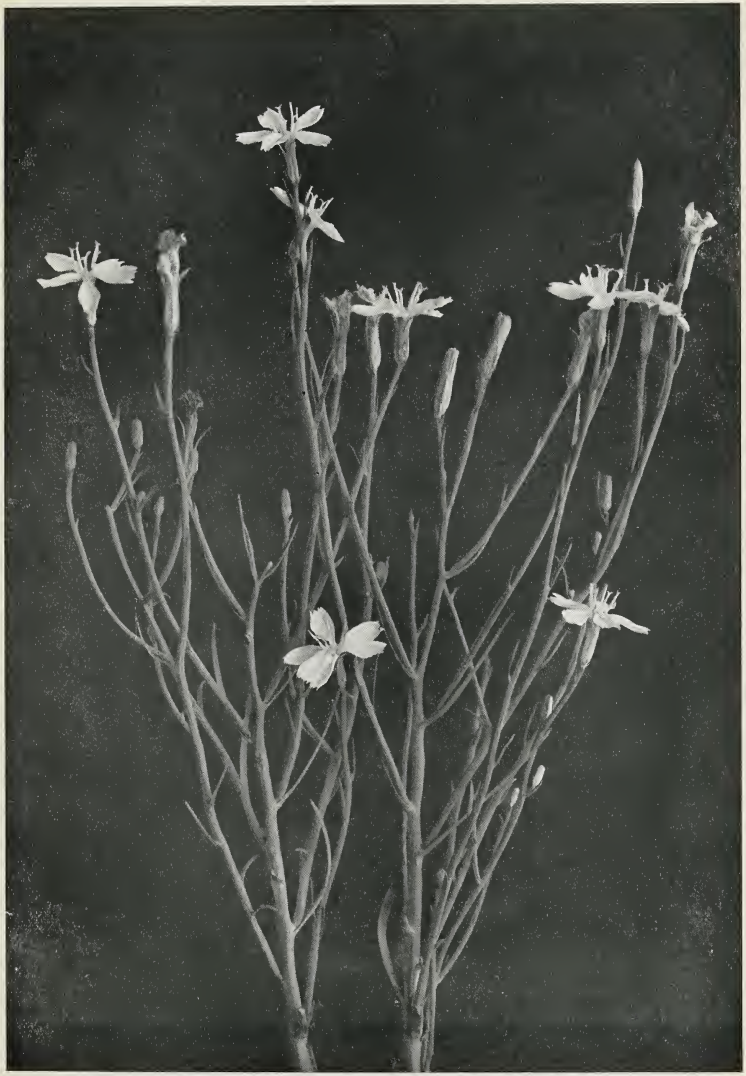
PRAIRIE PINK; SKELETON WEED

Lygodesmia juncea (*Pursh*) *D. Don*

Chicory Family

This meagre plant is in striking contrast to the umbrageous Cow Parsnip which we have just been considering. The one suggests the dry plains of the South, the other, the moist valleys of the North; the one suggests stern struggle against conditions adverse to life, the other, easy enjoyment of all the good things in the plant world. Yet I have seen them growing within a few hundred yards of each other, one on a gravelly, sunny slope, the other in the springy soil at the bottom. Each is a successful and (if we share Wordsworth's faith "that every flower enjoys the air it breathes") a happy plant.

The Prairie Pink is successful because it has adapted itself to hard conditions and ordered its life with frugality in all things. The roots are thick, woody, and deep in the soil, hence are not shrivelled up by drought. The leaves are reduced to narrow, pointed bracts in order that the scanty supply of moisture may not be lost by rapid transpiration. Even the flower-heads have only five florets instead of the one hundred or more found in many other members of the family—the dandelion for instance. The flowers, which open in bright weather and remain open but a short time, are a pretty shade of pink.



Prairie Pink; Skeleton Weed

SCARLET GAURA; BUTTERFLY WEED

Gaura coccinea Nutt.

Evening-Primrose Family

The Scarlet Gaura, an interesting plant of the open prairie, may often be found growing in gravelly soil from Manitoba to the Foothills of the Rocky Mountains.

The much-branched stems are usually decumbent (that is, reclining at the base with their tips ascending) and vary in height from four inches to a foot or more. The small and numerous leaves are usually hoary by reason of their close coating of short, gray hair. The drier the soil in which the plant grows the heavier is this protective covering.

But on the flowers our chief interest centres, for they have the curious habit of expanding four pure white petals and shortly afterward dyeing them scarlet. Hence, one may commonly find flower-spikes with white flowers above and brilliant scarlet ones beneath. This startling color scheme is rendered more striking by reason of the fact that the eight prominent stamens have white filaments and large brick-red anthers. Sometimes, however, the petals remain white during the whole of a warm sunshiny day. This was the case with the plants whose photograph, reproduced on the opposite page, was taken by the roadside at four o'clock of a day in early July. It will be noticed that the petals are drooping somewhat from the ardent heat, yet no blush of red has yet appeared. Some of these plants were taken home and placed in a cool cellar overnight. Next morning the flowers of the previous day were mostly withered, but five or six fresh, widely-expanded flowers adorned each stem. A good photograph of these plants with wide-awake blossoms was then made. Subsequently, when shown to a well-known botanist, the early morning photograph quite puzzled him, while the one taken in the afternoon was declared at once to be a typical picture of the Scarlet Gaura.

Here it has been thought better to present the plant in its drowsy aspect.

Scarlet Gaura; Butterfly Weed

PURPLE PRAIRIE CLOVER

Petalostemon purpureus (*Vent.*) *Rydb.*

Pea Family

The Purple Prairie Clover is a perennial with a deep, tough, woody root from which grow clustered stems in height from one to three feet. The smaller stems are simple, the larger branched, and each stem or branch is terminated by a short, dense flower-spike. Before the flowers open, early in July, the spike is a soft, pretty shade of gray, with spiral rows of closely packed buds. The lower buds open first, and the circle of bright purple corollas travels upward. The color scheme of the flower is rendered more striking by reason of the deep orange anthers that project beyond the corolla.

The structure of the flower is so different from the usual pea blossom that young botanists often have difficulty in identifying it. In the first place, it has no keel (formed by the union of the two lower petals). It has, it is true, a banner but represented only by a petal somewhat broader than the rest, the other four being alike. The five stamens are distinct from each other, as compared with the nine or ten more or less united stamens in other members of the family. Then the pod is very short with only one seed.

The Purple Prairie Clover is found abundantly on dry plains and gravelly hills throughout our territory. It is a typical dry ground plant, almost as much so as the Prairie Pink described and pictured on earlier pages. It has more foliage than the latter plant, but the leaflets are narrow and the edges are rolled inward to protect the under side of the leaves, where the breathing pores are located. Its root also is admirably adapted to withstand drought.

A white-flowered species, with somewhat broader leaflets and longer flower-spikes, is common in many districts. Two additional ones are also sometimes found—the slender white prairie clover and the silky prairie clover.

Purple Prairie Clover

NORTHERN HEDYSARUM

Hedysarum boreale Nutt.

Pea Family

The Northern Hedysarum is a native of the northern and western part of the Continent. Common among thickets, along roadsides, and on the plains, it is, over wide areas, quite the most abundant member of its family.

The picture shows it greatly reduced in size, as the plants photographed were more than two feet tall. The height, however, varies from one to three feet. The rather stout stems bear pinnate leaves, having from eleven to twenty-one leaflets. From the axils of the upper leaves spring long racemes of numerous pale pink, rose, or purple flowers. Although the stems are stiff, the drooping blossoms and light foliage lend an air of elegance and grace to the plant. The drooping flowers are succeeded by drooping pods. As these are prominently jointed, they serve as a ready means of identification.

Several other species of Hedysarum occur in Western Canada. As none of them seem to have yet been given a common name, they must be referred to by their botanical names. *H. sulphurescens* closely resembles the one described above but has sulphur-yellow flowers, and is found chiefly in the mountains and foothills. *H. cinerascens*, with reddish-purple flowers and silvery leaves, is found in dry soil on the prairie. *H. Mackenzii*, the most showy one of all, is common in the meadows of the foothills and eastward in the southern part of the prairie region. On river banks it seems also to be spreading far to the East and North. Its manner of growth—clustered stems, eight to eighteen inches high, forming a rounded mass of bright green foliage topped with clusters of large flowers of a vivid rose-purple—renders it one of the most striking and handsome of our wild plants.

NORTHERN HEDYSARUM

A FLOWER-BORDERED ROAD

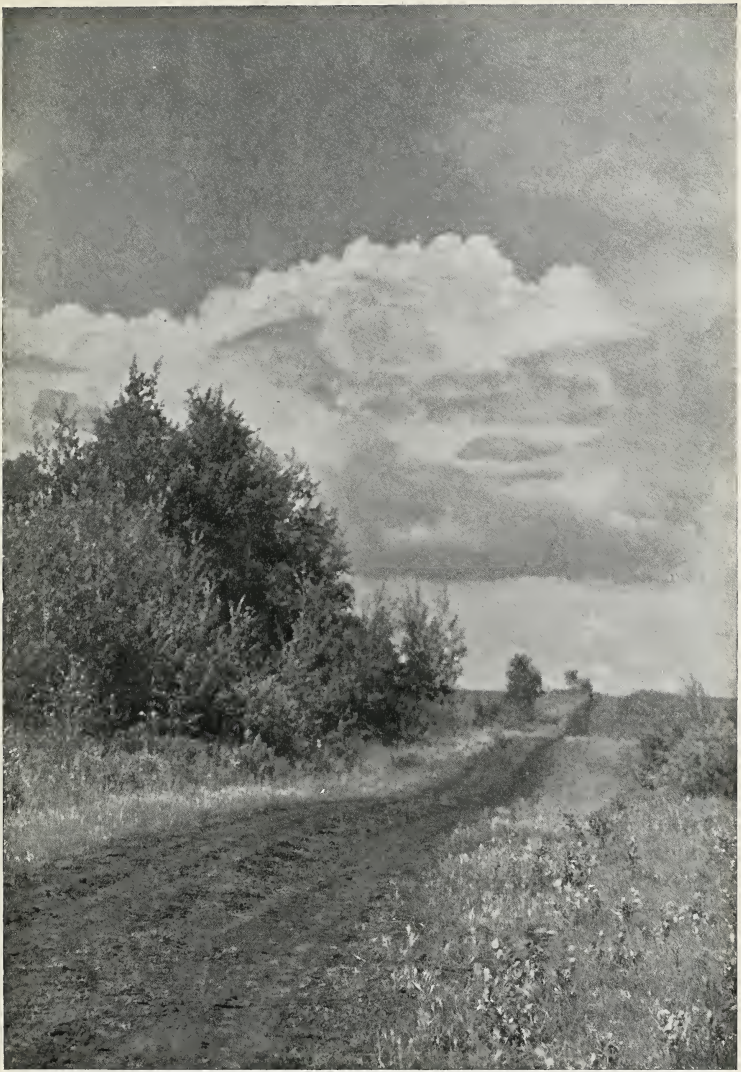
"A lover of nature never takes a walk without perceiving something new and interesting."—John Burroughs.

A flower-bordered trail over the gently rolling prairie, a clump or two of poplars or willows, overhead the deep blue sky and the splendid everchanging cloud formations—such a scene as this is repeated in endless variation throughout the Prairie Provinces during the Summer months.

A list of the roadside flowers would be too long for this page. They form a lovely natural calendar, giving to the observant passer-by accurate information concerning the character and progress of the season. No two years are just alike. Conditions of weather may hasten or retard flowering time. A wet year favors the moisture-loving plants and they make a remarkable display. A dry season discourages these and brings a different set into unusual prominence. One may use a road for a lifetime and still each year will show some new floral feature.

Just over the ridge on this road is a little pond which three years ago in June was filled with slender submerged stems and thread-like leaves of the White Water-Crowfoot, the surface being starred with thousands of the delicate, golden-centred blossoms. The following year the water disappeared. The Water-Crowfoot bravely met the new condition. It modified its leaves so that they could live out of water, threw out roots from creeping stems, and covered the mud with lacy foliage and the same pretty flowers. Last year the mud dried up, and only by careful search could a few weak plants be found among the coarse grasses and sedges that had taken possession. If this coming season the pond fills again will the Water-Crowfoot flourish as before?

This is but an example of the many stories of plant life that may be read as interesting serials while one travels familiar roads.



A Flower-bordered Road

HEDGE NETTLE

Stachys palustris L.

Mint Family

So common is the Hedge Nettle throughout Canada that it is no doubt known to most of our readers. Yet to know the name of a plant is but a preliminary to acquaintance, so let us consider this plant in some of its details of structure and habit.

Although hardly a kindly way to begin we shall carefully dig up a thrifty Hedge Nettle and examine its roots. At once it will be noticed that the plant is a perennial with quantities of long underground rootstocks. If our plant happens to grow on the edge of cultivated land these runners will have been directed away from the congestion behind towards the space and freedom of the garden or field. The Hedge Nettle can therefore travel toward opportunity.

In Autumn some of these underground stems become thickened until they look like slender white tubers, as indeed they are, for the portion connecting them with the plant is thin and easily broken, and, if these crisp tubers be taken and planted like potatoes, they will make a ready growth. The Hedge Nettle therefore carries life insurance.

Leaving the root, we notice that the stems are square. Now, square stems are said to have a mechanical advantage over round stems where leaves are borne oppositely, as in this plant. For it must not be thought that stems are a simple aggregation of cells. On the contrary, they are wonderful and complicated structures, each designed to carry the loads and stand the strains incidental to the particular type of plant and its manner and place of growth. Plants constructed reinforced columns and girders with great efficiency and economy of material, long before human engineers knew of such things, and the Hedge Nettle is no mean exponent of Nature's mechanics. Of course the stem has other functions besides that of furnishing support. Through special lines of cells in the stem the raw sap is carried upwards to the leaves, and through other cells the enriched sap is returned downwards to the roots, or carried to other growing parts of the plant.

Although space does not permit of it here, the reader may pass on to the consideration of the leaves, flowers, and seeds, assured that each detail of form and arrangement is of vital use and meaning in the life of the Hedge Nettle.

Hedge Nettle

GREAT-FLOWERED GAILLARDIA

Gaillardia aristata Pursh

Thistle Family

This Gaillardia, perhaps the handsomest member of the Sunflower tribe, is a native of the western hills and plains. Whilst found over a wide area, it is most abundant in the southern part of our territory. It prefers sandy and gravelly soil and rejoices in full exposure to sunshine. Its graceful form and its wonderful coloring have attracted the attention of horticulturists, so that today one may find it in the best laid out gardens everywhere.

The stems, one or two feet high, are gray-green by reason of their hairy covering, as are also the leaves. The flower-heads, carried singly on long stalks, are from two to four inches in diameter. At first the disk is flat and light green, but soon after shows an outer ring of dark red. As the florets open, the outer ones first, this red ring spreads inward, its progress being marked by the projection of successive rings of yellow anthers. Finally, the green buds having all opened, the whole disk becomes reddish-brown, convex in shape, and heavily fringed with brown hairs. The broad, overlapping rays, notched at the ends, are sometimes entirely golden yellow but oftener at the base are flushed dark red, and veined, especially on the underside, with the same color.

The whole combination of size, form, color, and texture is charming, and vests this Brown-eyed Susan of the plains with a wealth of glowing beauty. When each Province comes to adopt an official flower, the Gaillardia should be a candidate for such honor in the West.

Great-flowered Gaillardia

TALL MEADOW RUE

Thalictrum purpurascens L.

Crowfoot Family

Growing in open woods and thickets and along roadsides, this Meadow Rue, lifting its big panicles of cream-colored tassels six feet high, is one of the elegant plants of late June or early July. The large but finely divided leaves resemble coarse maidenhair ferns, and, together with the feathery bloom, give an airy grace to the tall herb.

It is usually of dioecious habit. Neither male nor female flowers have petals and the sepals are small and drop off early. The male cluster owes its beauty to the masses of anthers drooping on slender filaments, and the female cluster to the numerous bunches of pistils with long, glistening stigmas, which are admirably shaped to catch pollen as it drifts through the air.

There is here no elaborate arrangement for securing fertilization by insects and although they may sometimes be of service, chief dependence seems to be placed on the wind as carrier. Consequently the flowers are held above surrounding vegetation, and pollen is produced lavishly to allow for the great waste resultant from this simple method.

Sometimes the pistillate plants bear also a few stamens with fertile anthers, showing that there is perhaps an ambition to reach the higher development which would be indicated by the production of perfect flowers, a point already reached by some of the meadow rues.

In our greatly reduced photograph are shown two male plants on the outside and a female in the centre.

Tall Meadow Rue

LOCO-WEED

Oxytropis Lamberti Pursh

Pea Family

The Loco-weed, although well-known in Western Canada, is notorious rather than renowned. Its bad reputation is due to its poisonous effects when eaten by sheep, cattle, and horses, causing them to stagger in their gait, to walk in circles, and otherwise behave as no well-regulated animals should. Sometimes the death of the afflicted animals results. Yet there seems to be some mystery about the plant, for over certain wide areas where it grows one scarcely ever hears of a case of loco-poisoning, while other parts of the country report such an occurrence frequently.

The Loco-weed exhibits great variation also in form and color, both among individuals in the same locality, and among the types found in different localities. Our picture gives a general idea of the aspect of the plant—clustered leaves and flower-stalks springing from a deep root, both leaves and stalks more or less gray with silky hairs, and many pea-shaped blossoms borne in spikes. Frequently, however, the spikes are denser and shorter than those shown opposite, and, instead of light cream-colored flowers such as this plant produced, the bloom may be purple or reddish-purple.

Although "beauty is what beauty does" the Loco-weed is a pretty plant, and it has several handsome relatives. Foremost of these is the Showy Oxytrope found commonly on dry prairies from Manitoba to the Rockies. It may be distinguished from the Loco-weed by its more hairy leaves, which are so densely covered with long silvery hairs as to appear white; by its leaflets which are borne in bunches of three to five instead of singly; and by its more showy rose-purple flowers which are arranged in more narrow and elongated spikes. Indeed, the Showy Oxytrope (*O. splendens*) is well named, for with its shafts of bright blossoms rising from a mass of soft, shining white foliage it forms in June one of the most conspicuous and splendid ornaments of the dry prairie.

LOCO-WEED

NODDING WILD ONION

Allium cernuum Roth.

Lily Family

As a culinary herb the onion is known to everyone, but many fail to recognize in this dainty and graceful plant a member of that odorous tribe. And yet its narrow, long-necked bulbs possess the characteristic odor in such concentrated power as to render them highly objectionable to some people. Still, since the bulbs are deep in the soil, they need not interfere with our admiration for the pretty flowers.

The leaves of the Nodding Wild Onion are not hollow tubes like those of the garden onion, but are flat and grass-like, and pale green in color by reason of a whitening bloom. The flower-stalks, growing one or two feet high, over-top the leaves. Each stalk bears many nodding flowers in an umbel. At first each bud cluster is enclosed in a thin, semi-transparent membrane, as shown in the upper left-hand corner of our picture. Soon the expanding buds burst this fragile covering, and one after another open like tiny bells with six projecting stamens. In texture the flowers are thin and delicate, and in color they vary from white to rose, and purple, the more delicate shades being common.

The sheathed buds, rising upon a slender stalk and bursting into downward-pointed blossoms, suggest a rocket, which, rising high into the air, curves gracefully earthward and then, exploding, casts down a shower of gaily-colored stars.

The Nodding Wild Onion is a typical flower of the prairie country and in midsummer may often be found blooming on wooded banks among thickets, and in meadows.

Nodding Wild Onion

TALL OR GLAUCOUS ZYGADENUS; WHITE CAMAS

Zygadenus elegans Pursh

Lily Family

This beautiful Zygadenus may frequently be found in wet meadows throughout the Western Provinces. However it may occur, in scattered groups or in greater profusion, it is always in a quiet and elegant way an attractive feature of the landscape.

Springing from bulbous roots, the stems rise to a height of one to three feet. Both stems and leaves are smooth and glaucous —whitened with a bloom. The smaller stems bear their flowers in a simple raceme, but the stronger ones may carry a large, open panicle of bloom a foot in length. Each flower, about three-quarters of an inch in diameter, is white or greenish-white with a large green gland, shining with a moist secretion, near the base of each of its six divisions. The three-parted pistil with the six surrounding stamens adds much to the beauty of the flower.

This White Camas, to use another of its names, is unfortunate in its relatives. Several related species, known as Death Camas, are so poisonous that numerous animals, especially sheep, die each year from having eaten of them. The White Camas is said to have in some degree the same poisonous principle, but to be very seldom eaten by stock. With the descriptions here given and the picture shown opposite as guides to identification no one need make a mistake. The deadly species are smaller in size, with narrower leaves which are rather rough to the touch. Moreover, the gland, so distinctive of the White Camas, is not much in evidence in the smaller and more crowded yellow or yellowish flowers of the Death Camas.

Tall or Glaucous Zygadenus; White Camas

OVAL-LEAVED MILKWEED

Asclepias ovatifolia Dec.

Milkweed Family

A flower of such marked individuality as the milkweed, once seen in life or in picture, is easily recognized thereafter. For although several species occur in Western Canada, differing in color and in many details, the unique flower-form common to all, sets them apart from other plants.

The Oval-leaved Milkweed is probably the commonest western species, growing in rich, well-drained soil, either in full sunshine or among bushes, from Manitoba to Alberta. Its stalks are from six to eighteen inches high, its leaves, especially on the underside, are soft-downy, and its greenish-white flowers, sometimes tinted with purple, are borne in soft umbelled clusters.

And now to a closer study of these prettily and curiously formed flowers. In addition to the calyx, and a corolla with five reflexed lobes, there is in the centre of the flower a five-lobed structure happily named the crown. But when the botanist speaks of each lobe of the crown as a hood, and the hood as bearing a horn, and the horn as having a tooth on either side, it begins to grow confusing. Still, these features may be seen fairly well in our picture. But to study the inner structure of the flower in detail is impossible here. Suffice it to say that the pollen is produced in minute paired masses, each pair connected by a kind of clip, having a catch in the centre, and that the two pistils are embedded in a fleshy column. The problem of the plant is to bring the pollen masses of one flower into contact with the stigmas of another flower, and this can only be done by insect agency. Accordingly, the flowers secrete nector, and then advertise it by a heavy sweet odor which attracts bees and butterflies in large numbers.

Alighting upon one of the yielding flower clusters, the heavy bumble bee finds himself suddenly swinging head downward. Grasping frantically for a foothold, his legs are likely to slip into the catches on the pollen clips, and as he jerks himself free the pollen is torn from the flower and remains attached to his legs. Later, the same kind of a scramble for foothold while sipping nectar results in some of the pollen being rubbed off upon the stigmas of other flowers.

To the human observer this may seem a rough way of performing a delicate operation. It may also seem to be a highly complicated mechanism for producing the apparently small results attained, for of the thirty of forty flowers in a cluster, usually only one or two become fruitful and develop into big, soft pods of silky-tufted seeds. But although we may wonder at Nature's methods, they are here amply justified in the final result, for the milkweeds are a numerous, vigorous, widely distributed, highly successful tribe of plants.

Oval-leaved Milkweed
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ROUGH FLEABANE DAISY

Erigeron glabellus Nutt.

Thistle Family

Fleabane daisies are extremely common in Western America. In Rydberg's Flora one hundred species are described, of which probably one-third are found in Canada. A number of these, however, grow only in the mountains.

The Erigerons are often mistaken for Asters. Without going into botanical details, it may be said that the former bloom in June and July, the latter in August and September. Also, the Erigerons have smaller and much more numerous disk florets, and narrower and more numerous ray florets than the Asters. This may be seen in the picture opposite, where the close firm disk, made up of a multitude of tiny florets, is encircled by a thick fringe of fine rays numbering one hundred or one hundred and fifty.

The Rough Fleabane grows in dry soil and is common on the prairie. Its stems are from five to fifteen inches high. They and the leaves are usually somewhat rough to the touch, although hardly rough enough to justify the common name of the species. The flower-heads on each stem are few in number, but, as the stems are clustered, the flowers make a pretty show among the grass. Their disks are yellow, and their rays blue, purple, mauve, or occasionally nearly white.

An earlier-flowering species is so abundant and showy that it must have at least a few words of description. It is the Philadelphia Fleabane, with upright stems, usually from two feet to three and one-half feet high, each carrying many pink or lavender flowers. Unlike the Rough Fleabane, this species loves wet ground. One may often see stretches of low land brightened by its myriad blossoms, or with even greater pleasure one's eye may trace the winding course of a brook through a meadow, by the bands of these gay flowers along its margins.

Rough Fleabane Daisy

WILD BERGAMOT

Monarda mollis L.

Mint Family

This is a handsome member of the aromatic Mint family, growing in abundance on the prairie, along roadsides, and among open thickets. The stems are one to two-and-a-half feet high, bear gray-green, soft-hairy leaves, and are crowned in midsummer by rosy-pink or lilac flowers in dense clusters. These open from the centre outward. The long, narrow, upper lip of the corolla stands erect, the lower and broader lip is curved downward, as are also the buds, both being covered with soft hairs and showing delicate gradation in color from nearly white to purple. The combination of form, texture, and color throughout the entire plant is in quiet, but elegant, taste.

Unlike the eastern Bergamot many flowers are open at once, so that the head is full and fluffy. This fulness of flower-head, or length of spike, is noticeable in many plants of Western Canada. The phenomenon is due to the coolness of the nights, to frequent summer showers, and to the moisture-holding power of the black prairie soil. In an unusually hot and dry season, the individual flowers fade more quickly and the richness of the floral display is diminished.

WILD BERGAMOT

To discover such a fern-filled woodland as this would be delightful anywhere, but especially is it so in the Prairie Provinces, where, owing to the moderate rainfall and dry air, ferns are not as much in evidence as in the moister parts of Eastern Canada and British Columbia. It has been stated that ferns are not found anywhere in the prairie region even where trees and brush abound. Such a statement overstates a tendency, since our picture, taken in prairie country, is evidence that luxuriant beds of ferns do so occur, further, they are more numerous than is commonly believed.

They do not of course occur on the dry, open plains. Shade and moisture are necessary for this Ostrich Fern, as it is called, with its great fronds three to six feet high. But such favorable conditions are found in wet woods and thickets, especially along streams, and from Newfoundland to British Columbia, one occasionally meets with it. As will be noticed, the fronds grow in clusters or crowns. These spring from underground runners sent out the previous season by the older rootstocks. Hence, when the plant finds a suitable habitation, an extensive mass of lovely foliage is soon formed.

Ferns do not, like the flowering plants, produce seeds, but rather great quantities of spores, minute and dust-like. These spores are often borne in cases on the backs of the ordinary leaves, but in other species, the one before us for example, special contracted leaves, called fertile fronds are produced.

Ferns are an ancient race. Before the coming of any bright-colored flowers, even before the grasses, they appeared on the earth. They flourished in great splendor during the Carboniferous age, reaching the size of great trees. Along with giant club-mosses and horsetails, they covered the interminable marshes of that time, and from the tropical luxuriance of their growth resulted most of the coal beds of the world. Although appearing so early, perhaps millions of years before man, the grace and elegance of fern foliage, even as known to us in the smaller forms descended from that distant age, has never been surpassed. The Fern still delights us by its charming form and restful green, and the strength of its appeal is measured by the certainty with which it is assured a place in our schemes of home and garden decoration.

A Ferny Dell

GREAT WILLOW-HERB; FIRE-WEED

Epilobium angustifolium L.

EVENING-PRIMROSE FAMILY

"A goodly and stately plant, having leaves like the greatest willow - - - - garnished with brave flowers of great beautie, consisting of four leaves apiece of an orient purple color."
John Gerard, 1545-1612.

Growing to a height of three to eight feet, its stems thickly set with long, narrow, willow-like leaves, each stem topped by a big spike-like raceme of bright purple blossoms, the Great Willow-herb is a striking and handsome feature of any landscape where it occurs. And its occurrence is extremely common, for the Great Willow-herb is one of the eminently successful plants of the Northern Hemisphere. It succeeds by endowing its numerous seed-children with almost unequalled means for rapid and distant travel. Hence they are always first, or amongst the first, to reach land newly cleared by axe or fire, where they quickly cover the charred desolation with the beauty of their fine foliage and brilliant flowers.

The lower flowers on the stalk open first, and in the early period of bloom the anthers ripen and shed most of their pollen. During this time the style is bent down out of the way and the lobes of the still immature stigma are not yet opened. After the pollen is gone the style straightens, and the four branches of the stigma expand to form a cross directly in front of the centre of the flower. Now this arrangement obviously prevents self-fertilization. It also ensures cross-fertilization by the bees For the bees are co-workers with the flowers in this matter. Bees always begin at the bottom of a flower-spike and work upward, hence when they leave the newly-opened blossoms at the top they are well dusted with pollen. Flying to another plant, most of this pollen is rubbed off on the ripe stigmas of the lower flowers, and so the process is repeated throughout the bright hours of the midsummer day. That the bees and the flowers work together effectively is shown by the heavy spike of long, well-filled seed pods that almost invariably results.

For a picture of the seed pods and some facts regarding the great buoyancy of the tiny, down-tufted seeds, the reader is referred to page 128.

Great Willow-herb; Fire Weed

GRASS OF PARNASSUS

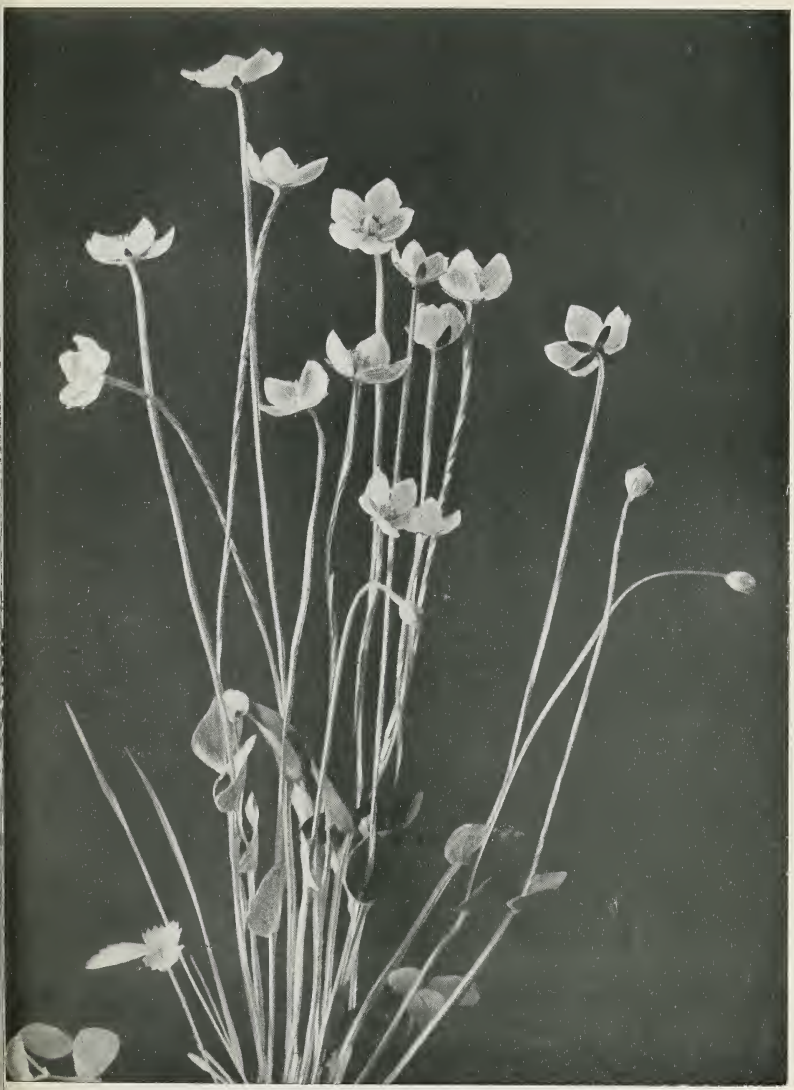
Parnassia palustris L.

Saxifrage Family

For a plant with short, broad leaves and showy white flowers "Grass of Parnassus" seems a strange name. It has, however, the sanction of distinguished origin and ancient usage, having been applied to this very species by Dioscorides, a learned Greek physician of the first and second centuries, who has been called the founder of botany.

The entire-margined, heart-shaped leaves of the Grass of Parnassus all spring from the rootstock, with the exception of a single one, which clasps the stem one-third of the way to the flower. Each stem, four to twelve inches high, terminates in a single white blossom an inch or so in diameter always facing the sky. Although of a very common form—open, regular, and five parted—these flowers have such individuality of detail that once attentively observed they are not afterwards forgotten or confused with others. The broad petals are clearly and handsomely veined with light green. In front of each stands a fan-shaped group of nine to fifteen slender white filaments each topped, not by an anther, but by a small yellow knob. Together the five groups form a kind of grille surrounding the inner parts of the flower. Since even minute details of structure are not without use and meaning in the life of a flower, it will be an interesting problem for readers to discover what purpose is served by this unusual and prominent floral accessory. The centre of the flower is, of course, occupied by the ovary—the immature seed capsule—which is short and round, and bears on top three or four stigmas. These stigmas, however, do not ripen until late in the blooming period. Surrounding the capsule and alternate with the petals are five stamens whose method of development is worth watching. When the petals first expand each stamen is close-folded against the capsule. Soon one of them straightens up, elongates its filament, and takes a place in the centre of the flower directly in the way of alighting insects. Later, probably the next day, a second stamen, ripening its pollen, acts in the same manner. The other three follow suit, the anthers of the earlier ones having meanwhile shed their pollen and fallen off. This deliberate development gives insects ample time in which to accomplish their mission of cross-fertilizaton, and full seed-pods usually result.

In midsummer, throughout Canada to the Arctic Circle, the starry blossoms of the Grass of Parnassus form constellations in many wet meadows, and a Milky Way around many a grassy pool.



Grass of Parnassus

SPREADING DOGBANE; FLY-TRAP

Apocynum androsaemifolium L.

Dogbane Family

Although placed by botanists in a separate family, the dogbanes are allied to the milkweeds. The same kind of milky juice promptly oozes from the slightest abrasion of their delicate skin. Both have simple leaves with entire margins, and both bear pods filled with down-tufted seeds; but, whereas the pods of the milkweeds are fat, spindle-shaped, and upright, those of the dogbanes are long, slender, and drooping. In bloom also they differ, the umbelled, complex flowers of the milkweeds being replaced in the dogbanes by open clusters of simple bell-shaped flowers.

The Spreading Dogbane, a common plant throughout Canada, grows on wooded banks, among thickets, in fields, and along roadsides. Studied in these different situations, it exemplifies very nicely the influence of illumination on plant form and growth. In woodlands the plant is tall, and the leaves on each branch are arranged in one plane in order to take full advantage of the overhead light; the flower clusters terminating the branches are comparatively small, and the whole effect is that of a richly-leaved plant sparingly adorned with pretty pink blossoms. In full sunlight the plant is lower and more spreading, the leaves are smaller, relatively fewer in number, and more or less twisted out of the horizontal plane. The flowers on the other hand are much more abundant, and often the large open clusters on the more numerous branches unite to form a floral hemisphere, or sometimes almost a sphere within which the leaves seem of quite secondary importance.

As might be expected, the plants growing in the open bear the greater number of seed pods, for insects love the sunshine, and, like the milkweeds, the Spreading Dogbane is dependent upon their good offices for the fertilization of its flowers. It has, however, a terrible way of punishing certain small flies who apparenty are unable to be of service in this matter and yet desire the flower's nectar. As the unwelcome visitor eagerly reaches for the honey, it frequently happens that his tongue is caught in a notch in the centre of the flower, and, unable to free himself, the unhappy creature slowly dies of starvation. In the shade this tragedy is seldom seen, but in sunshine it is so common that the plant is sometimes called Fly-trap.

Spreading Dogbane; Fly-trap

GIANT HYSSOP

Agastache Foeniculum (Pursh) Kuntze

Mint Family

In midsummer the breath of the prairie is fragrant with the spicy odors of the mints. In midwinter, if one shake up the hay in the farmer's mow, the air at once becomes redolent with the same perfumes which recall to memory the warmth and color of the sunlit plains.

Certain members of the family are low-set plants with small flowers clustered in the axils of the leaves; others, like the Wild Bergamot described on a previous page, are taller with showy terminal flower-heads; still others are coarse and weedy.

This Giant Hyssop, a tall and handsome mint, may frequently be seen on the plains, along fence rows, and among bushes from Manitoba to Alberta. Its smooth, sharply angled stems grow from two to four feet high. Its anise-scented leaves are of marked beauty, being firm in texture, triangular-ovate in outline, sharply and evenly toothed, dark green and strongly veined above, and a clean white beneath. The flowers, produced over a long season, are borne in terminal spikes two to five inches in length. Frequently these spikes are compact throughout, but the larger ones may be interrupted by pairs of small leaves and short lengths of stem. The bright blue corollas, about two-fifths of an inch long, project almost at right angles to the stem. The calyces are also tinted blue, and after the corollas wither and fall off this blue shade deepens, leaving the tall, leafy wands still conspicuous and decorative through the rest of the Summer.

It is interesting to notice that, whereas, in a simple flower-spike the blossoms open in a regular, easily recognized order, here, in the spike of the Giant Hyssop, they seem to appear at random up and down its length. Yet for each plant there is a master design, and it cannot be doubted that these flowers also open in a definite, predetermined order. But in these dense spikes the scheme is not readily apparent, for we have here a double geometrical design, first in the arrangement of clusters on the stem, and second in the arrangement of flowers in the cluster.

GIANT HYSSOP

WILD MORNING GLORY; HEDGE BINDWEED

Convolvulus sepium L.

Morning Glory Family

". . . . . *And starred with a myriad blossom the long convolvulus hung;*"—*Tennyson.*

Draping banks, bushes, and fences with handsome foliage and beautiful trumpet-shaped flowers, the Wild Morning Glory twines its graceful way from Newfoundland to British Columbia. Its trumpets are sometimes pink with white stripes, but in Western Canada they seem to be usually white, and since we have here the unusual phenomenon of both pollen and pistil being white, the flower is arrayed in bridal purity. In the throat of the flower are fine tubes in a circle (they may be readily seen in the picture opposite), each with a honey gland. Occasionally a big sphynx, or humming bird moth may be seen hovering over these wells of nectar, but in Western Canada certain species of bees are the usual insect visitors.

The Morning Glory climbs by twining its stems around any support within reach. When, in the Spring, from the perennial root a new shoot starts growth, its tip begins to revolve. Describing, as it lengthens, ever-widening circles, it seeks something on which to ascend. If fortunate in touching anything, it at once begins to entwine the support and seems by such contact to be stimulated to greater growth. If nothing be found, the shoot at length becomes so heavy that it falls prostrate, but the growing tip, like Antaeus touching the ground, finds new strength from the contact to again raise itself and swing in circles from this advanced point. If several shoots chance to come together they entwine each other, forming a living cable. Such cables may often be seen writhing up from the ground as if in an agony of endeavor to reach some support. Being stiffer than a single strand, they rise higher and may sometimes attain to an overhead branch that would be beyond the reach of a single shoot. The claim has been made that climbing plants can sense in some way the proximity of a suitable support. Wonderful stories in support of such a claim have been told. But, on the whole, facts seem to discredit such a theory. The reader may easily try some simple experiments which might help to decide this interesting point.

Wild Morning Glory; Hedge Bindweed

BLAZING STAR; BUTTON SNAKEROOT

Liatris scariosa Willd.

Thistle Family

Common names of plants are oft-times curious and sometimes inappropriate, but whoever called this one Blazing Star had a pretty fancy. The plant grows on dry plains and hills among short grasses above which the flowers shine brilliantly. On nearer view, the overlapping bracts of the involucre—the scales surrounding the flower-head—are seen to be dark red in color. As the florets open, long style-branches of a vivid rose-purple are thrust out, as if from the dull smoldering glow of the bud had erupted darting tongues of flame.

As to its other name, Button Snakeroot, the button is the globular corm, or rootstock, an inch or so in diameter, at the base of the stem, and it is reputed to be a remedy for snake bites.

The plants vary in height from six to eighteen inches, depending upon the fertility of the soil and the amount of moisture it contains. They are in bloom about the first of August. The flowers are interesting and unusual for this reason:—In most flowers the style is rather inconspicuous, its function being to connect the stigma and ovary, and to hold the stigma in the proper position to receive pollen according to the special method adopted by each plant. But in the case of the Blazing Star, although the style-branches are stigmatose only at the base, there is a remarkable development carried to such a degree that it is the styles that make the flowers showy, not the usual gaily-colored corollas.

Blazing Star; Button Snakeroot

PAINTED CUP; INDIAN PAINT BRUSH

Castilleja miniata Dougl.

Figwort Family

That the Figwort family contains many floral oddities is evidenced by the common names of some of its members, such as snapdragon, turtle-head, monkey-flower, owl's clover, elephant's head and so on. Nor are these names so wildly fanciful, since the resemblances are sometimes very real. In the elephant's head for instance, each tiny flower on the long, slender spike imitates the broad spreading ears and the upturned trunk of the elephant in a remarkable manner.

The Painted Cup, a familiar plant from Manitoba to the Rockies, is curious in a different way. The flowers are borne in dense leafy spikes at the top of a leafy stem, but, being greenish-yellow in color, they are scarcely noticeable among the longer and more brilliantly colored bracts, which look as if they had been dipped in a pot of scarlet paint. Its other common name—Indian Paint Brush—is therefore more appropriate than Painted Cup. Still, the color of the bracts varies greatly, not only in the several species found in Western Canada, but also among different individuals of the same species, ranging from scarlet and brick-red to rose, pink, and even to white. Individually, the plants are rather coarse but in the mass their effect is beautiful, and many a hillside and prairie seems aflame with them.

Not the least interesting fact in the life of the paint brush is its deviation from what one might call the standards of common honesty in plant life. For frequently this plant attaches itself to the roots of other plants and steals from them their life juices. In short, it seems to be by instinct, if not always by opportunity, a parasite. Still its moral declension is not complete. For in the case of those plants which are wholly parasitic in nature their low character is usually revealed by the absence of green color in their leaves. But where, as with the paint brush, the theft is incidental, as it were, where the plant can, and to a certain extent does, live by its own exertions there is usually little outward sign of this brand of degeneracy.

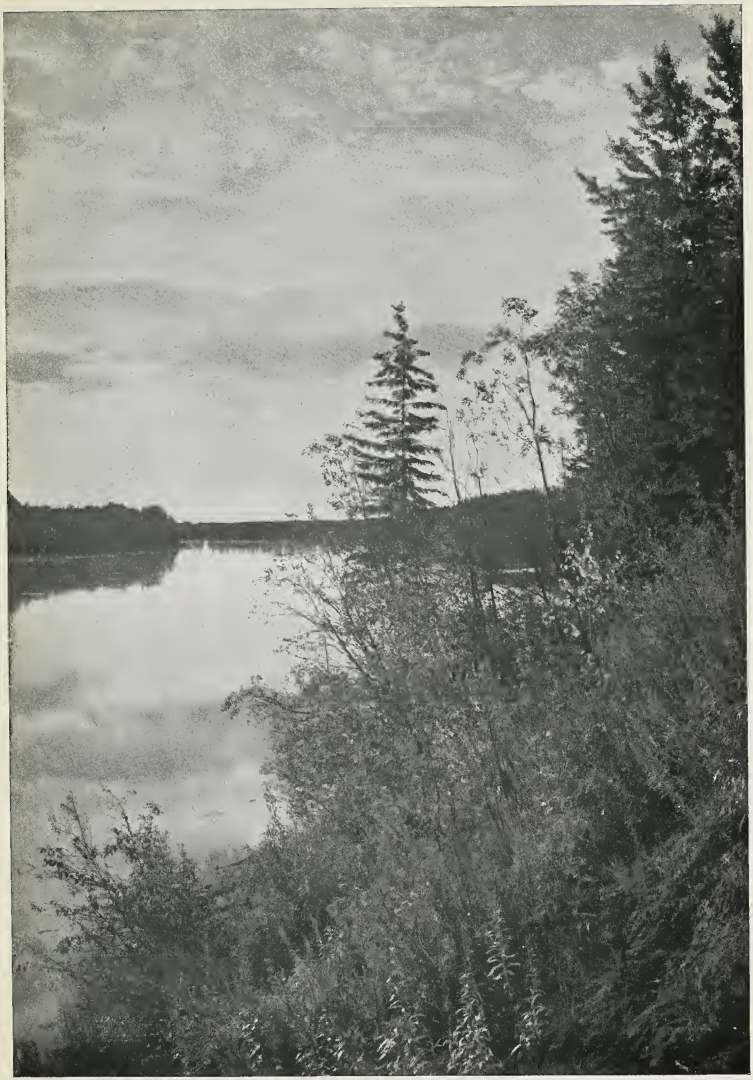
PAINTED CUP; INDIAN PAINT BRUSH

A WESTERN RIVER SCENE

"But there is one thing a large river does for one that is beyond the scope of the companionable stream,—it idealizes the landscape, it multiplies and heightens the beauty of the day and of the season. A fair day it makes more fair, and a wild and tempestuous day it makes more wild and tempestuous. It takes on so quickly and completely the mood and temper of the sky above . . . . How it enhances and emphasizes the beauty of those calm motionless days of Summer or Fall,—the broad glassy surface perfectly duplicating the opposite shore, sometimes so smooth that the finer floating matter here and there looks like dust upon a mirror;—"

—John Burroughs.

Not always is the river so placid as in our picture. When summer heat melts the snow on the mountains, and summer rains along its great length swell the flood, the water rises rapidly and sweeps along in swelling strength chafing at its steep clay banks and carrying away soil and plants that are not firmly anchored. Hence, we find that the perennial plants that grow on these steep river banks are either grasses with numerous intertwining rootstocks firmly binding together the soil, or else plants that have deep and strong roots, like Hooker's mugwort, shown in the foreground of our picture, Mackenzie's hedysarum, the deflexed oxytrope, and other herbs of like habit. Sometimes several inches of surface soil will be carried away from the tap roots of these plants and the roots with their tufted stems hang down, dirty and forlorn. But abatement of the flood brings restoration to air and sunshine. The leaves quickly resume their interrupted functions, the stems bend upward hopefully, and soon the bank is again clothed with clean, fresh verdure.



A Western River Scene

GIANT SUNFLOWER

Helianthus giganteus L.

Thistle Family

The Giant Sunflower is so called because of its tall stems which sometimes grow ten feet high, although half that height or less is commoner. As compared with the thick stems, broad leaves, and massive heads of the cultivated Russian sunflower, it is not at all gigantic, for its stem is usually much branched and, except at the base, rather slender, its leaves narrow and taper-pointed, and its flower-heads only two or two-and-a-half inches across. Still it is a big, vigorous plant and with such a capacity for spreading and massing that it may often become a troublesome weed in low ground. From the Lake of the Woods to the Rockies, the Giant Sunflower is abundant and furnishes in many a mid-summer landscape great expanses of radiant color.

If a stem of this big herb be dug up in Autumn it will bring with it a great cluster of roots. Some are ordinary feeding and anchoring roots, others are so thickened as to look like small sweet potatoes. From among these, spreading out in all directions, are stout creeping rootstocks. In these spindle-shaped tubers is stored concentrated building material upon which the runners draw in early Spring, so getting a good start in their work of extending the sunflower colony.

GIANT SUNFLOWER

BROAD-LEAVED ARROW-HEAD

Sagittaria latifolia Willd.

Water-plantain Family

A handsome plant is the Arrow-head with distinctive and decorative leaves and flowers. Growing in shallow water or mud, along the margins of ponds and streams, it occurs commonly and often abundantly throughout most of the North American continent. Since aquatic plants are subject to sudden changes in their surrounding conditions—floods may increase the current of the streams and raise the water in the ponds, or drought may dry up both—it is not strange to find that this plant exhibits great variation in size and form. Its height may be six inches or two feet. Its leaves may be broad or narrow, but, unless submerged during growth, they retain their arrow-head shape. The plants are occasionally dioecious but usually monoecious, that is, bearing both male and female flowers on the same plant but separately. As may be seen by referring to the picture opposite, both kinds grow in clusters of three around the common flower-stalk. Both kinds also have three glistening white petals more delicate than the most gauzy fabric ever spun by man. But in the centre of the male flower is a beautiful cluster of golden stamens, while in the female flower is a dull green, rounded mass of pistils.

The superior beauty of the male over the female blossom, although not fully apparent in our picture, is quite pronounced, and follows a general rule among plants. Many other examples of this might be mentioned—for instance, the long drooping male tassels of the birch and alder as compared with their small inconspicuous female catkins, or the golden dress of the male willow as compared with the quieter silver of the female. Again, in the case of the cultivated squash or pumpkin, both sexes have great orange-yellow trumpets, but the female, close-seated upon the embryo fruit, is partly hidden by the leaves, while the male rises up on a long stalk to better display his splendor. Yet these decorative distinctions of male and female dress and form are not motived by anything corresponding to human vanity; rather they spring from vital necessities in the life, not of the individual, but of the species.

BROAD-LEAVED ARROW-HEAD

MARSH FELWORT

Pleurogyne fontana A. Nels.

Gentian Family

This plant is probably an unfamiliar one to many of our readers. It is said by the late Mr. J. M. Macoun to be characteristic of alkali flats in the southern part of the prairie country, and Rydberg's Flora gives its habitat as mountain bogs. The plants pictured on the opposite page grew hundreds of miles from the international boundary and far from the mountains, and it probably occurs on brackish shores and in salt marshes over a wide range.

One reason why it is little known is its habit of opening its flowers in bright sunshine only, and then for but a short time. Another is that its usual rather desolate surroundings do not promise the flower lover much in the way of floral beauty, and he is likely to turn to more fertile fields. Finally, it is a capricious annual and may appear in a neighborhood one season and then not to be seen again for several succeeding years. In this latter elusive quality it resembles its beautiful relative the fringed gentian whose flowers of heavenly blue have captivated alike the poet and the artist.

Individual plants of the Marsh Felwort, even when growing together, differ curiously in size. Some are three or four inches high bearing but one or two blossoms, each slender stem bending to the lightest breeze. Others grow to a height of fifteen inches and are stiffly erect with a dozen or more close-set flowers. The white corolla is so deeply cleft into four or five lobes, that each seems to be a separate petal. At first sight, also, the flower seems to have neither style nor stigmas. The style is indeed lacking, but closer examination will revel the latter as stigmatose lines on the sides of the ovary—quite an unusual arrangement.

The flowers open in late Summer and it is always a pleasant surprise to find such pure and delicate beauty amid the usual coarse vegetation of its environment.

Marsh Felwort

LESSER PASTURE SAGE BRUSH; WORMWOOD SAGE

Artemisia frigida Willd.

Thistle Family

In Western Canada grow many species of *Artemisia*, known variously as wormwoods, sage brushes, or mugworts. Most of them are dry ground plants, a few are found in moist valleys, and one at least (*A. biennis*) has become in many places a common and unsightly weed. Certain kinds, especially the European wormwood (*A. Absinthium*) grown in many gardens and escaped from them to the roadside, are so widely used as domestic medicine that "wormwood tea is an odorous memory with every person who was reared in the country."*

Those species of *Artemisia* commonly called sage brushes are characteristic of arid regions, where over large tracts they sometimes constitute almost the entire vegetation. We have all heard of, even if we have not seen, the sage brush desert whose gray monotony impresses travellers as they cross the continent by southern railway lines. Such universal grayness of tone is due to the fact that stems, leaves, and flower-heads of these plants are all densely coated with white hair or wool. The protection thus afforded is two-fold: first, transpiration is greatly diminished; and, second, the chlorophyll—the green coloring matter of plants in the tissue beneath the hairs—is shaded as by an awning from the destructive action of too intense sunshine.

The Lesser Pasture Sage Brush pictured on the opposite page is one of the smaller of these desert sages. It has, however, a range extending far beyond the desert, being found northward as far as Hudson's Bay and Alaska. Over much of this great expanse it occurs sparingly in small colonies on particularly dry banks or hillsides, but in the arid part of the Canadian plains it sometimes covers the ground over considerable areas.

Considered, not as a hundred or a thousand acre carpet, but individually in detail, it is a pretty plant with soft masses of finely-cut, silvery foliage above which in late Summer rise silvery plumes eight to twenty inches high. Along the slender branches of these stems are strung round and nodding flower-heads, pearly gray on the outside, but soon opening to emit the tiny yellow florets.

*Liberty Hyde Bailey.

Lesser Pasture Sage Brush; Wormwood Sage

WHITE PRAIRIE ASTER

Aster commutatis T. and G.

THISTLE FAMILY

In the floral pageantry of early summer the Asters take no part, but from midsummer onward they demand increasing notice until in the climax of splendor with which the season closes they occupy the premier place. Other handsome flowers in great number and variety join in the display, but many of them furnish only here and there outstanding points of color, valuable additions to the general effect, but still merely incidental. Not so the Asters! Vast plains, unending miles of roadway, and innumerable swamps, thickets, and forest glades are beautified by their myriad blossoms.

Asters respond kindly to human care, and in England these Michaelmas daisies, as they are called, are highly esteemed and generally cultivated. In Canada little attention of this kind has yet been paid to them. But, although neglected by human gardeners, Nature here uses them lavishly, and many a lonely settler's simple home is transformed and glorified by the blue and white of asters and the yellow of goldenrods.

This White Prairie Aster is common in dry and sandy soil from Manitoba to British Columbia. Its stem, somewhat branched, grows one or two feet high, its leaves are small and narrow, both stem and leaves are hairy, but one notices little such details, as attention is centred upon the splendid panicle of white flowers, a particularly fine specimen of which is shown on the opposite page.

A closely allied species, the White Wreath Aster (*A. multiflorus*) with smaller flower-heads and a more branched stem, grows in similar soil over an even wider territory.

The Smooth-leaved Aster (*A. laevis*) with rather compact panicles of sky-blue flowers is one of the most abundant and elegant forms in open woods, on the edge of thickets, and along fence rows.

In swamps we frequently find a stout, rough-hairy, purple-stemmed Aster (*A. puniceus*) bearing aloft above the tallest sedges a great pyramid of large lilac-blue flowers.

Scattered along hilly roads and on openly wooded hillsides is the Showy Western Aster (*A. conspicuus*) whose broad leaves and flat-topped clusters of large violet or pink-purple flowers quite justify its name.

Many other kinds merit mention. The ambitious young student may find some difficulty in the exact determination of species, but both he and the amateur lover of flowers will find interest and pleasure in their great variety and beauty.

White Prairie Aster

DRUMMOND'S DRYAS FRUITING ON A GRAVEL-BAR

Dryas Drummondii Richards

Rose Family

Having now considered many flowers, it seems fitting that, before bringing this series to a close, we should glance at a few of the seeds, or fruits as a botanist calls them, the production of which is the object of all blossoms.

Our photograph of Drummond's Dryas, fruiting on a gravel-bar of a great northern river, was chosen because it illustrates so well the frequent beauty of this final stage in plant growth, and also the lavish manner in which seeds are usually produced.

This plant forms dense mats of foliage above which in early Summer rise small, short-stemmed flowers. The petals wither, and the numerous styles afterwards elongate into twisted awns, fringed throughout their length with fine hairs. While still immature these styles are tightly twisted together, but when ripe they fluff out into a downy ball two inches or more in diameter. The seed-stems lengthen to eight or ten inches, thus raising the seed-heads well above the leaves.

As to the beauty of such a Dryas bed there can be no question. The soft, feathery expanse of plumose seeds gleaming in the sunshine quite surpasses in attractiveness the same bed when dotted with small yellow flowers. And since this one colony shows thousands of seed-heads, and each head has about one hundred and fifty seeds, some idea of the great quantity of seed produced is readily formed.

But, when the individual plant has ripened a good crop of seed, the achievement will be of little benefit to the race unless the seeds reach a place where they can grow successfully. If they fall directly to the ground, then, in the case of all perennials, the parent itself becomes the chief danger to its offspring. Plants, therefore, have developed many devices to scatter their seeds abroad.

As is fitting, these Dryas seeds, born beside the water, are good swimmers. They are also able to fly, although not with the buoyancy of thistle-down. Using both modes of travel, they quickly reach and triumphantly occupy the gravel-bars on thousands of miles of northern waterways.

Drummond's Dryas Fruiting on a Gravel-bar

A GROUP OF AIRSHIP SEEDS

Ready to start on the great adventure

Of the many methods of seed dispersion that of using the wind as carrier is one of the most common and most effective.

In the picture opposite we have an interesting group of such airship seeds. The centre is occupied by a spike of the great willow-herb, or fireweed, whose forty long pods contained about twelve thousand seeds On a dry day it is a pretty sight to see these pods splitting open, their four slender divisions curving quickly but gently outward into the form of a cross, and the imprisoned down instantly fluffing out as if delighted to find freedom. The seeds lose no time in starting on their momentous journey, but eagerly commit themselves to the first passing breeze. The launching of these tiny, crowded airships is in open situations usually attended by few mishaps, and away they sail, each freighted with a potential fireweed that may by and by bloom in splendor on some distant clearing. These seeds are extremely light and buoyant. Twelve hundred of them weigh less than one grain, and in a still room, experiment showed that on the average the seeds took forty seconds to fall eight feet. The slightest upward breath of air sent them soaring, and in the open there is no doubt that they rise to great heights and travel long distances.

On the left of our picture are opened milkweed pods. Each held about fifty large, brown seeds. These pods split open along one side only, and at first no silk is seen, for the flat seeds overlap one another like the scales of a spruce cone, but as drying progresses the elasticity of the compressed hairs pushes up and out seed after seed to be whirled away by the wind. The weight of each is more than one hundred times that of a fireweed seed, yet the sustaining power of its large and beautiful parachute is such that it has one-fifth the buoyancy of the lighter seed.

To the right are five disintegrating cylinders of the long-fruited anemone. While still intact, all the seeds—about two hundred and forty to each—are on the outside, arranged in well-ordered spirals with the wool tightly packed within. When the expansive pressure of this drying wool finally bursts the neat cylinder, the crinkly wool separates into little tufts with a seed

A Group of Airship Seeds

in the centre of each. These weigh fifteen times as much as, and have one-eighth the bouyancy of the fireweed seeds.

In the lower right hand corner are two heads of *Troximon*, an artistic ally of the dandelion. At the bottom are three globes of the dandelion itself, and above them the half-dozen small heads are those of the golden aster. These three plants belong to the Thistle family and serve to illustrate the fruiting method of many of their kindred. As the dandelion, especially, is so well-known it is unnecessary to describe this method in detail. Every child has played with dandelion "clocks" and watched the seeds sail away before his vigorous puffs. The dandelion seeds are quite light—about four hundred of them weigh one grain—and yet in a quiet room their buoyancy is only about one-tenth that of the fireweed seeds.

This comparison suggests that other factors play a part in the successful spread of a species. From a close, hard fight the fireweed flies far away to seek easier conditions elsewhere, but the dandelion stays and fights it out, successfully competing with even blue-grass sod, and dodging serious lawn-mower injury by spreading its leaves flat and bearing its flowers on very short stems. Then, just when the seeds are ripe, the stems shoot up and lift the seed-heads well above the grass. The dandelion seed may not travel so far as that of the fireweed, but it will germinate and thrive where the latter would perish.

Here we must leave this interesting subject. The reader, however, may by observation and simple experiment easily continue its investigation.

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