

The Last Weeds of Summer

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*This is the ninety-eighth of NATURE
MAGAZINE's special educational inserts*

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DANA BURNET is an artist who has effectively used the keys of his typewriter and piano to paint the pictures in his mind. For years he supplied the popular weekly and monthly magazines with tried-and-true stories of the rich boy who married the poor girl, or vice versa. But to him and to at least one of his heroes or heroines his greatest claim to lasting fame will rest with a verse, little of which is generally known. Even in writing a soliloquy of a man "In a Death House" he finds something solid to which to cling, when he tells us:

"But light and song are freedom's
wear.

And even death-doomed men
However they may lock their brains
Fall dreaming now and then,
And see the white topped daisy-fields
Go marching up a glen."

It is of these daisy fields, and of other weeds of the late summer season—and even of early winter—that we now write. It is rather distressing to find that, as with buttercups, *The Bible* makes no reference whatever to any of the eighteen weeds we have selected to represent late summer and fall. It happens, however, that of the eighteen, only chicory and oxeye daisy are both conspicuous plants and native to the eastern Mediterranean area, where *The Bible* had its setting. Too, many of the poets who have written of daisies were not botanists, and have used the word with generous poetic license. Shelley, Burns, Wordsworth, Milton and Shakespeare make only incidental reference to the plants we choose to recognize here, and not one seems to have been at all discriminatory in comments made.

Concerning our fall flowers, we find Henry Ward Beecher, in his "Discourse of Flowers," giving us in prose something of the philosophy we had in mind. He says, "As for . . . valorous



White Snakeroot



Boneset



Joe Pye Weed

sunflowers, we shall never have a garden without them, both for their own sakes and for the sake of old fashioned folk who used to love them." Again, he speaks of "broad-faced sunflowers." Wordsworth recognizes the almost universal reference of poets to daisies by calling the daisy "the poet's darling," and begins to do a little better than the average with such an ecological observation as:

"The daisy by the shadow that it
casts,
Protects the lingering dew-drop
from the sun."

And Shelley goes a bit "high-brow" when he tells us:

"Daisies, those pearly Arcturi of the
earth,
The constellated flower that never
sets."

Burns is a little more commonplace, as you would expect, and gives us:

"Now Nature hangs her mantle green
On every blooming tree
And spreads her sheets of daisies white
Outwre the grassy lea."

What would Burns do without a "grassy lea?"

Some years ago, I wrote a number of articles dealing with the silhouettes of weed shadows along a sidewalk, and was delighted to find that Wordsworth, while he was not interested in species identification through shadows, found beauty in these things. He wrote:

"Would that the flowers were born
to live
Conscious of half the pleasure which
they give,
That to this mountain daisy's self
were known
The beauty of its star shaped shadow
thrown
On the smooth surface of this naked
stone."



Horseweed



Wild Sunflower



False Sunflower



Elecampane

For a while, at least, let us ignore the impression these weeds may have made on writers of prose and poetry, and consider the evaluation given them by the farmer, the doctor and the botanist. My grandfather, a dirt farmer, in his incidental conversation taught me to recognize chicory, elecampane, tansy, black-eyed Susan and horseweed, of the eighteen weeds I have selected to represent the fall flowers.

I am sure that all of the weeds I have considered here are well known to farmers of the East and middle-West, and some of them are known to farmers of the far West; a few are known to farmers everywhere in the world. What interests me is that these homespun folk told me nothing of the nature of the plants, how they affected the grazing cattle on which their own prosperity depended, how they anchored the topsoil that they were losing with every shower, and, on occasion, how they even affected skins and noses when the weed dust was breathed, or rubbed on

sweat-covered skin. These were trifles then, perhaps.

In reading the accompanying tabular material, you may be impressed with the fact that most of these weeds are perennial, and that many have substantial horizontal root systems, ideal for anchoring the soil in the fence-rows where the plants grow naturally. It is possible that, because of this stabilizing effect, many a farm has paid off its mortgage rather than going on the auction block. It should be noted, also, that most of these weeds yield readily to the simplest methods of weed control, and only the oxeye daisy vigorously resists strong applications of 2-4-D, and similar chemicals.

Of particular interest to farmers are the sections in our tabular material dealing with the coneflower, daisy, elecampane, gumweed, horseweed, sneezeweed, tansy and white snakeroot.

Many of these weeds have had a prominent place in the homely folklore dealing with our health that may well be yielding to the supersalesmen of television, who tell us what we should eat, drink, and smoke. In the tabular material, we have tried to suggest the diminishing public interest in many of the fall weeds formerly contributing to the medicine chests of many a farm. A few of these weeds may have lasting merit in this connection, but most of them persist more in the common names of the plants than they do in actual medical merit and practice.

Some of the names of plants that refer to a real or purported medical value are sneezeweed, gravel-root, scabroot, boneset and a few others. Of course, boneset never set any bones, but folklore has it that it produced a medicine that might be taken when a bone was being set. Possibly this is because it has such a vile taste that one would, temporarily at least, forget the anguish of bone-setting in the distress caused by the medicine.

Much of the medical lore about these plants persists in print long after the recognition of merit has been discarded. We have carefully tried to distinguish between the real and the rumored values.

Along with medical values, of course, come food values, and we have tried to present a fair picture of these, also. Few people recognize any food value in the



Blazing Star



Black-eyed Susan



Cone Flower



Gumweed



Purple Coneflower



Sneezeweed

majority of the weeds considered here. Most of the pertinent food values are presented in the tabular material. Daisies and chicory may produce excellent pot-herbs or green salads. In Africa, the leaves of a close relative of our common bur marigold, or pitchforks, are cherished for this purpose by the natives. There seems to be little likelihood that our American species would satisfy an American appetite in this way. Chicory, of course, offers us a coffee substitute when its roots are collected, ground and roasted just after the period of flowering has passed. It also requires some faith and imagination to recognize the coffee flavor in chicory. One of the close relatives of the sunflower is the Jerusalem artichoke, whose underground tubers are really delicious to many. Moreover, they yield a non-fattening starch that some people would welcome into their diets.

When domestic mammals eat these plants as forage, startling things may happen, as a glance at the sections on sneezeweed, tansy and white snake-root will show. In the section dealing with daisies, we point to the practice of salting the rosettes of daisies to induce cattle to graze them so closely that they may not survive. Incidentally, too, the salting upsets the physiology of the plant so that it may die anyway. Where source material was available, we have passed on information relative to the resistance of these plants to weed sprays, their tendency to attract insects—the way golden glow attracts aphids, for example—and occasionally some other idiosyncracies of these weeds.

Botanists may note that all of the eighteen plants selected for presentation belong to the family Compositae. This was done because late fall seems to be a climax season for the composites, much as early spring gives emphasis to the maples, willows, poplars and oaks; late spring to the lilies and irises, and early summer to the buttercups, mustards, roses and legumes. The eighty-seventh insert dealt solely with the goldenrods and asters, and was therefore another composite monopoly, as well as another number dealing primarily with autumn weeds. It might be well

to review this number of our series for some other aspects of this large family of flowering plants.

In answer to requests that have come in, we continue to include in the tabular material data on the chromosome number of many of the species, and some reference to the soil preferences of the plants. Some reference also has been made to the importance of such plants in supplying food for seed-eating birds in winter. In this service, the composites probably rank well with such families as the docks, the grasses, the amaranths, the mustards and the legumes. This information should appeal primarily to serious students of botany, and of ecology and wildlife management.

Our selections include most of the major groups of the composites that are based on the types of flowers to be found in the flower head. This information, too, is in our tables. These types include heads that are composed solely of flowers of the tubular type, with heads made of flowers that are all of the "ribbon," or strap-shaped type, and with heads that have (Continued on page 480)



Bur Marigold



Garden Sunflower

COMMON NAME	SWEET JOE-PYE-WEED	THOROUGHWORT BONESET	WHITE SNAKEROOT	BLAZING STAR
SCIENTIFIC NAME	<i>Eupatorium purpureum</i>	<i>Eupatorium perfoliatum</i>	<i>Eupatorium rugosum</i>	<i>Liatris scariosa</i>
DESCRIPTION	Erect, to 10 feet high, rather coarse, with smooth or downy stem that is branched or unbranched, greenish or bluish, green- or purple-jointed, ridged or round in cross section. Leaves opposite or whorled, in 3s to 6s, long-petioled, to 1 foot long and 3 inches wide, smooth or downy, with saw-tooth margins, thin and vanilla-scented when broken.	Coarse, hairy stems to 5 feet high, branched above and pale green, rather brittle, ridged and erect. Leaves opposite and joined at base, so that they appear to be pierced by the stem, sometimes 3 at a joint, taper to elongate tip, prominently veined, saw-toothed margins, to 8 inches long and to 1½ inches wide, pale green like stems.	Grows to height of 4 feet or more. Stems smooth, to somewhat sticky, relatively slender, much branched at top, erect. Leaves opposite and in general outline much like those of associated nettles, to 6 inches long and to 3 inches wide, with petioles to 2½ inches long and slender, margins saw-toothed. Turn conspicuously black with first killing frost.	Height to 5 feet. Stem erect, usually unbranched, even in upper portions, arising from a solid base that is nearly spherical. Leaves alternate, rich green, rough or finely hairy, to 6 inches long and to ½-inch wide, entire and with the upper narrower than the lower, usually somewhat resinous in nature.
RANGE AND RELATIONSHIP	North American native of rich, dry, usually limy woods, or where soil is moist, from New Hampshire to Minnesota and south to Nebraska, Oklahoma, Tennessee and Florida. There are 500 species in the genus, mostly perennials and sometimes shrubby, tropical or subtropical. Some forms found in Eurasia.	North American origin. Often common in low swales, wet shores, woods, thickets and marsh borders. From Quebec to Florida and west to Manitoba, Texas; in south, in Alabama, and in northeast, in Nova Scotia. The bracts of the structure enclosing the heads of the members of this genus are unequal in length.	At best in rich woodlands and thickets or woodland borders. Ranges from the Gaspé Peninsula south through New Brunswick and New England to Georgia and Alabama, in the uplands, and west to southeastern Saskatchewan, northeastern Texas and northern Louisiana and on into Virginia. One of the conspicuous plants of woodlands in late summer within the range.	North American native. Genus with some 35 species native to eastern and central parts of the country, sometimes considered as in genus <i>Laciniaria</i> or <i>Laciniaria</i> . Typical of open country roadsides from Maine to Florida and west to the Rocky Mountains and into southern Canada. Found mostly in the drier soils.
REPRODUCTION	Flowers are all tubular, borne in somewhat cylindrical heads of 3-7 flowers, each with its pistil and stamens, and producing fruits to 1/5-inch long. Heads appear to be creamy white, pale pink, or pale blue or lilac. Flowers appear from mid-July to mid-September, with fruits often persisting until freezing. Chromosome number 20.	Flowers in heads, including 10-40 flowers that are white to purpletinged, with the heads crowded on stem branches to form flat-topped clusters. Some flower clusters come from stems that arise from bases of leaves that are not terminal. Corolla tubular. Fruit is 5-angled, black or brown, with yellowish dots and crowned with hairy parachutes.	Flowers in heads of 15-30 flowers, each to ¼-inch long, brilliant white, and maturing to bear fruits with white downy crowns so that a plant in flower or in fruit gives a conspicuous white effect. Each flower bears both pistils and stamens, or, rather, one pistil and 5 stamens. In distance, woodland with this in prime may appear to be smoky. 20 chromosomes.	Heads composed of 25-60 flowers, each with its pistil and stamens. Corollas are a brilliant magenta purple. Heads are hemispheric and are arranged along the stem but not too crowded. Heads enclosed in bracts in 5-6 series. Fruits are crowned by finely barbed bristles that form a parachute, which carries them with the wind.
ECOLOGY	Root yields a bitter, astringent, acrid substance used as home remedy for a diuretic, tonic and stimulant in treatment of "stones" in bladder or kidneys; hence common name of plant, "gravel-root." Root is to 1 inch thick, hard, tough and with thin gray bark. Medicinal quality which gave name kidney-root has not been recognized in modern medical lore.	Flowering season from July through September, with the fruits being shed in the winds into late fall or winter. Leaves contain the glucoside eupatorin, which has been used in medicine as a tonic or in large doses as an emetic. Plant is easily controlled by cultivation, drainage or hoeing.	Flowers from July through November, and leaves may remain green in woodland where other plants have dried and apparently died. Leaves and stems contain poisonous tremmerol, which is soluble in milk fat. Cattle eating this may yield poisonous milk, causing milk sickness to both cattle and man. Cattle tremble, are depressed, constipated and nauseated.	Flowering time is from August through September and the plants are likely to dominate the countryside with their beauty during this period. The two most popular species are, in addition to this one, <i>L. elegans</i> , which has 9 chromosomes, and <i>L. pycnostachya</i> , either of which may be transplanted. Does not favor acid soils.
ECONOMY	As a weed this plant is not serious, as it yields readily to cutting, and frequent mowing is enough to control without use of sprays or plowing. The "Weed Flora of Iowa" states that this weed is useful in the treatment of jaundice, rheumatism, dropsy or gout, and that it is a diuretic. This may be questioned.	Dried leaves yield the fluid extract once recognized as important medicinally. Raised as a drug plant, one acre of ground should yield 1 ton of dry material once valued at 10 cents a pound. Its use now is most limited, and may be eliminated entirely in time. Such common names as boneset, ague-wort may have some remote significance.	Milk sickness in man may cause weakness, vomiting, thirstiness, dry skin, constipation, slow breathing, low temperature, collapse and in some cases death. Cattle should not be allowed to graze in woodlands where white snakeroot is the dominant green food, for obvious reasons. Affected cattle may have difficulty in standing and in breathing or walking.	To some degree, these plants have a recognized use as ornamentals in flower gardens but hardly to the extent they deserve. The species here used is chosen not because of its exceptional beauty but because of its distribution, which gives it a wider audience. Common names include gay feather, blue feather, button snake-root, rattlesnake master.

<p>GUMWEED. TARWEED STICKY HEADS <i>Grindelia squarrosa</i></p>	<p>HORSEWEED CANADA FLEABANE <i>Erigeron canadensis</i></p>	<p>ELECAMPANE SCABROOT <i>Inula helenium</i></p>	<p>FALSE SUNFLOWER OXEYE <i>Heliopsis helianthoides</i></p>	<p>CONE FLOWER GOLDEN GLOW <i>Rudbeckia laciniata</i></p>
<p>To 3 feet high, with stout, branched stems that are smooth and commonly with a reddish cast. Leaves strongly dotted, entire or finely toothed more or less clasping at the bases, alternate rough, to 1½-inch long and to ½-inch wide and with the lower usually narrowed at base but still clasping.</p>	<p>Height to 10 feet. Stem relatively slender, densely covered with stiffish hairs, or smooth, much-branched with the uppermost branches turning conspicuously upward at their tips. Leaves alternate, the lower to 4 inches long, blunt, generally entire, broadest near the tip, sometimes obscurely notched. Annual.</p>	<p>Height to 6 feet. Stem coarse and branched or unbranched, hairy or closely and densely downy on upper parts. Perennial. Leaves large and coarse, to 20 inches long and to 8 inches wide, downy and rough above, the larger ones with long petioles, the smaller upper ones with no petioles but with clasping bases, conspicuously veined, entire.</p>	<p>To 5 feet high. Stem branched or unbranched, smooth or nearly so, somewhat ridged, stiff and somewhat coarse. Leaves, opposite, ovate, slender pointed with saw-tooth margins and rounded bases, usually slightly roughened, conspicuously veined, to 6 inches long and half as wide, sometimes borne in whorls of three. Perennial.</p>	<p>To 12 feet high, profusely branched, with stiff, somewhat ridged stems that are essentially smooth, or only slightly fuzzy, or with a bloom. Leaves are finely divided into 5-7 divisions with each division in turn deeply notched. Leaf may be more than 1 foot wide, thin, often downy above, with stem leaves the smaller. Plant is perennial and hardy.</p>
<p>Native of North America and found most commonly in dry pastures, meadows and roadsides. From New York and Pennsylvania to Manitoba, Texas, Arizona and Mexico, but less abundant in eastern portion of the range. A common plant in the prairies of the middle-West. 30 species in western North America, Peru and Chili.</p>	<p>Found over almost all of North America of which it is native but not found in extreme north. Also found widely distributed in Asia, Europe, South America and the West Indies. There are more than 150 species in the genus giving a wide geographic distribution. Most commonly found in fields and waste places.</p>	<p>Introduced from Europe and now well established in America along roadsides, overgrazed pastures, and in dry fields and meadows. From Nova Scotia to North Carolina and west to Missouri and Minnesota. Of more than 100 European species, this seems to be the only one to have established itself in America. Other species in Asia, Africa and Europe.</p>	<p>Native of North America and found from southeastern Canada south to Florida and west to Tennessee and the Dakotas, being found on occasion in isolated areas to the northeast. Of the 6 species found in the genus all are natives of North America. Ordinarily is to be found in swales, open woodlands, thickets and dry banks, usually mixed with other plants.</p>	<p>Native of North America. This species ranges from Quebec to Florida, west to Arizona, Colorado, Idaho and Manitoba, but is often found under cultivation as an ornamental, particularly in older long-established flower gardens and around old farm houses. Other species of the genus are also used frequently in cultivation. Favors rich low lands.</p>
<p>Heads have distinctly tarry or gluey feeling because of nature of surrounding bracts which have conspicuously backward bending tips. Inner ray flowers have both pistils and stamens, and the petal-like outer ray flowers bear pistils only. Ray flowers to 1 inch long or may be absent. Fruits are to 1/7-inch long, finely ridged and with 2-8 awns.</p>	<p>Flowers borne in small, slender, bell-like, erect heads, numerous, about 1/5-inch across. Ray flowers short, white, numerous, but relatively inconspicuous. When fruits have been shed, the base is rather conspicuous because of the persistent backward-bent bracts that enclosed the heads. Chromosome number is 18.</p>	<p>Flowers found in large heads at or near tips of uppermost branches. Heads are to 4 inches across and to 1 inch high, with outer flowers pistillate and central disc flowers with stamens and pistils. Rays are numerous, slender. Fruits are coarse, 4-sided, smooth, dry. Bracts enclosing heads are almost leaf-like. Chromosome number 20.</p>	<p>Flowers borne in conspicuous heads that are to 3 inches across and terminal or axillary in the uppermost leaves or branches. Ray flowers are to one inch long and bear pistils that may mature fruits, yellow. Disc flowers bear both stamens and pistils and are also yellow. Fruits are smooth, to 1/5-inch long, without any terminal parachute. 32 chromosomes.</p>	<p>Flowers are in heads borne at the ends of the branches. Heads are to 4 inches across with 6-10 ray flowers each of which may be to 2 inches long, bright yellow, drooping or slightly recurved. Central flowers form a compact cone that is greenish-yellow and about twice as long as thick. Fruits are flattened, oblique at base and to ¼-inch long.</p>
<p>Flowers from June through September. May be considered a seriously poisonous forage for cattle where there is selenium in the soil. Elsewhere it is harmless. Herbs yield a diuretic, tonic substance used by some in treatment of asthma, whooping cough and kidney troubles. It is not unattractive as a roadside plant.</p>	<p>Flowers appear from June through November. A drug from this plant produces a dermatitis, sore throat, smarting eyes and sometimes prostration. It is diuretic, astringent, tonic, and is used in treating chronic diarrhea and in some types of hemorrhages. Common in dry hay, it may affect the skin of those who handle it extensively.</p>	<p>Flowers from July through September or later to south, with fruits being borne through October. Fruits are commonly heavily infested with insects. Plants are sometimes cultivated by dividing root systems in fall and setting divisions in rows with each row to 3 feet apart and sections 18 inches apart. Leaves considered questionably edible.</p>	<p>Flowers from early June through and beyond September with heads bearing fruits persisting into the winter. Differs from sunflowers in that the ray flowers may yield fertile seeds. Bracts of the structure that encloses the head are larger to the outside. Scientific name means that the flowers have the appearance of sunflowers.</p>	<p>Flowers from July through September, but colored heads persist until winter sets in. Well-known golden glow is a double-flowered form of this species, but either plant is an attractive fall flower, whether wild or cultivated. Plant has been suspected as being poisonous to hogs with properties similar to those found in belladonna and therefore serious. Not proved.</p>
<p>Presence of plant in pasture is considered by range managers as evidence of overgrazing practices. Control is effective by mild use of a low-concentrated 2-4-D, or it may be controlled by hoeing or by cultivation of ground before the fruiting time. It is not persistent on lands where crop rotation or open cultivation is the practice.</p>	<p>Plant yields readily to treatment with low-concentrated 2-4-D, by repeated cutting, by burning or by open cultivation practices. The ill effects on the skin may sometimes resemble trouble caused by poison ivy. Name possibly came from abundance of weed in horse pastures, but in spite of danger as skin irritant it has been used to rub down horses. This is probably unwise.</p>	<p>One acre may yield 1 ton of roots, with nation's consumption about 25 tons a year. Root used as drug that is aromatic, acrid, diuretic, expectorate. Root is powdered for medicinal use or fresh roots are candied in sugar and used as a medical confection, considered by some useful as cough cure. Plant is also known as scabroot, implying another use.</p>	<p>Apparently there are no medicinal properties recognized in the plant, nor is it poisonous. It yields readily to cultivation and so cannot be considered as a weed by farmers. This leaves its claim to fame primarily on the beauty of the flowers. It apparently has accepted this responsibility, because the flowers are attractive!</p>	<p>Weight of tops may often break the stems either of the wild or the cultivated forms. Therefore rigid supports are suggested. Plants may be almost covered with aphids or plant lice that are often red, so where flowers are to be picked the plants should be sprayed in advance with some spray that controls aphids.</p>

COMMON NAME SCIENTIFIC NAME	BLACK-EYED SUSAN YELLOW DAISY <i>Rudbeckia hirta</i>	PURPLE CONEFLOWER <i>Echinacea purpurea</i>	GARDEN SUNFLOWER <i>Helianthus annuus</i>	WILD SUNFLOWER <i>Helianthus decapetalis</i>
DESCRIPTION	To 3 feet high. With few if any branches in the erect, stiff, brittle stem that is rough, covered with fine stiff hairs and usually dark-colored at least when mature. Leaves are thick, alternate, the lower with long petioles, to 7 inches long and to 2 inches wide with the uppermost the smaller.	Height to 5 feet. Stem smooth or covered with short rough bristles, branched or only sparingly so. Leaves alternate, rough, conspicuously veined, long-petioled, to 8 inches long and to 3 inches wide with shallow scallops on margins, the uppermost usually without any petioles. Perennial arising from thick, dark rootstocks.	To more than 15 feet high. Stem coarse, erect, rough-scaled, branched or unbranched, somewhat hollow but substantial nevertheless. At least the uppermost leaves are alternate, petioled, conspicuously 3-veined and with blade 1 foot or more across and pointed, rough on each side, and usually fuzzy beneath, in general heart-shaped. Annual.	Grows to 5 feet high but is usually lower. Stem is branched or unbranched, slender, rather stiff, smooth or nearly so and arising from a substantial and sometimes thickened rootstock. Leaves alternate above and opposite below, thin, to 8 inches long and to 3 inches wide, rough above and downy beneath, the lower ones with petioles.
RANGE AND RELATIONSHIP	Native of North America. Common in open dry meadows preferably where soil is somewhat acid. Favors considerable exposure to sun and so may persist in pastures where hot sun has removed some other plants from competition. Ranges from Florida to Ontario and west to Texas, Colorado and Manitoba. About 40 related species in North America.	Native of North America. Ranges from Georgia to Louisiana and north to Virginia, Ohio, Michigan, Illinois and Iowa with related species extending the range of the genus much farther to the west and occasionally found in isolated areas to the northeast. It thrives in open sun, in deep rich soils of the open prairie country.	Native of North America or Peru, but found in gardens from Minnesota to Texas and west to the Pacific and grown in fields and gardens widely over the world. Has been found apparently wild as far north as Saskatchewan. May establish itself where it has been under cultivation. At its best in rich garden or prairie soils.	Native of North America. Ranges from Quebec to Georgia and west to Missouri and Michigan, with closely related species extending the range. 75 species in the genus give it wide range on the whole but about 5/6 of the total are to be found within the United States. The sunflower is the State flower of Kansas.
REPRODUCTION	Flowers in attractive terminal heads with flowers of two kinds. Ray flowers are to 2 inches long, orange yellow, neutral and numbering from 20-40, notched or not at tip. Compactly crowded disc flowers are dark brown and produce fertile seeds. Fruits have no parachute and so cannot be windborne.	Flowers in huge solitary terminal heads, with 10-20 ray flowers, sometimes to more than 2 inches long and dark purple or rarely whitish, drooping or spreading conspicuously. Ray flowers are neutral. Disc flowers borne on a cone-shaped base, dark brown to black, bearing both pistils and stamens. Fruits are substantial, four-sided achenes.	Flowers in terminal heads, which may have a diameter of more than 2 feet. Ray flowers, yellow streamers, do not mature fruits, and much fewer than the disc flowers that bear both stamens and pistils and mature fruits and are purple to brown. Fruit is a flattened oval achene that may be light gray, black or striped but widest at the free end. Ch. number, 34 or 68.	Flowers are in good-sized heads borne at the stem and branch tips, the whole head sometimes being more than 3 inches across. Ray flowers are yellow and number 8-15. Disc flowers are tubular, bear both pistils and stamens and are crowded into center of head into a rather flat-topped formation, as compared with <i>Rudbeckia</i> .
ECOLOGY	Flowering season from May through September, with tops persisting often through the winter in identifiable form. May provide some doubtful forage for sheep where other pasturage is poor. May also provide some soil anchorage where soil is poor and otherwise with little protection. Races vary in fuzziness of cover and in length and color of the ray flowers.	Found growing either on acid or calcareous soils. Flowering from July through October, or even November, with fruits borne through the winter on the stiff dead stalks that persist. In some areas it may be considered as a pest, but usually it does not become dominant over plants growing in similar situations.	Flowers from July through September with fruit-bearing heads persisting into the winter. Root system may occupy a cubic yard of soil and 1 acre of sunflowers may lose nearly 400,000 gallons of water through transpiration. Fruits are sought by many seed-eating birds, particularly members of the sparrow family who may ruin a commercial crop if undisturbed.	Flowers from August into October, with the fruit-bearing stems persisting into the winter. Fruits of most of the sunflowers were gathered by the Indians and used as food either raw, crushed, roasted or salted. In many respects they equal salted peanuts, but their shells are not removed as easily.
ECONOMY	Flowers are sufficiently attractive to have been grown as ornamentals in some flower gardens, but farmers ordinarily consider it as a weed or as a sign of poor soil since it is rarely found in rich pastureland where other plants compete effectively. The plant is the Maryland State flower.	Control is simple, if plants are cut before seeds mature. While mid-Westerners consider it a weed, Easterners may plant it in their flower gardens and show it with pride. Certainly its beauty exceeds that of many plants that find encouragement in flower gardens, and the seeds may be bought in ordinary seed stores for use in growing as ornamentals.	Fruits make superior food for poultry and are highly favored for use at bird-feeding stations. Fruits are high in their oil content, and oil has diuretic and expectorant properties medicinally. Oil is used in making soap, as food and for treatment of leather. Plant has been under cultivation in the American Southwest since before 1000 A.D.	Roasted sunflower fruits have been used in the making of a coffee substitute but it is unquestionably of inferior quality. This species, found most commonly, is not listed as a bad weed largely because it does not grow where cultivated plants are to be found, and because it yields readily to almost any control measure.

BUR MARIGOLD PITCHFORKS <i>Bidens frondosa</i>	SNEEZEWEED <i>Helenium autumnale</i>	OXEYE DAISY WHITEWEED <i>Chrysanthemum leucanthemum</i>	TANSY <i>Tanacetum vulgare</i>	CHICORY BLUE SAILORS <i>Cichorium intybus</i>
<p>To 5 feet high, with stems stiff, branched, smooth or nearly so, purplish when mature. Leaves opposite, usually smooth but sometimes roughened, thin, to 4 inches long and to 1 inch wide, with the lowermost divided into 3-5 segments with the terminal one particularly long-pointed, long-petioled and with a groove on the upper side of the petiole.</p>	<p>Height to 6 feet or even more. Stems are conspicuously angled and winged, branching freely in upper portions, pale green, slender or stout, smooth or meekly downy. Leaves alternate, coarsely toothed, to 5 inches long and to 2 inches wide with blades pointed at each end and petioles forming narrow wings that extend to the stems.</p>	<p>To 3 feet high. Stem erect, green, somewhat ridged, slender, nearly smooth, usually unbranched, arising from a short, thick, horizontal, perennial rootstock and a leaf rosette that remains green through the winter. Leaves to 3 inches long, dark lustrous green, the lower with relatively long petioles and conspicuously toothed margins.</p>	<p>To 3 feet high. Stem may be profusely branched in the upper areas, or may be wholly unbranched, smooth or downy, stiff, rather brittle, strongly scented when broken. Leaves to 1 foot long, deep rich green, dark, alternate, featherlike with division petioled, with upper leaves and lower leaves in general similar but smaller above.</p>	<p>To 4 feet high, with well-branched stems, erect, hollow, green changing with maturity to purplish or red or brown, tough, wiry, difficult to cut with lawn mower, woody when mature. Leaves much like those of a dandelion and in rosettes; may be confused with them, to 6 inches long, the lower with long petioles and the upper without, with deeply toothed margins.</p>
<p>Native of North America from Nova Scotia to Florida and west to California and British Columbia, with some 75 other species extending the range of the genus considerably. It has been introduced and established widely in southern Europe. Grows best in wet pastures, gardens and along wet roadsides but it is not too particular about sun or shade.</p>	<p>Native of North America, where this species is found from Quebec to Florida and west to Arizona, Nevada, Oregon and Manitoba, reaching to 2000 foot elevation in Virginia. All of the 24 species of the genus are native of North and Central America. Favors swamps, wet and flooded lowlands, often being at its best in gravel or gravelly soils.</p>	<p>Native of Europe, but too well established in American pastures, meadows, waste places and roadsides through most of North America. Less abundant in the South and the West. It is abundant in Asia and well established on other continents. There are some 100 species in the genus, few of which are to be found in America. Some are of value as greenhouse plants.</p>	<p>Native of Europe but well established in North America largely as an escape from flower or herb gardens. Established from Nova Scotia to Georgia and west to Nevada and Oregon and particularly common in East around abandoned farm homesites. Of the 30 species in the genus two are established in eastern United States and in California; others in Eurasia.</p>	<p>Native of Europe but too well established in fields, waste places, gardens and roadsides of America from Nova Scotia to North Carolina and west to California and Manitoba. Of the 8 species, all are native of Europe and only this one has established itself in America to any considerable extent. It grows in almost any kind of soil and may crowd lawn plants out.</p>
<p>Flowers in many heads borne at the tips of the uppermost branches. Each head is to 1 inch wide and about 1/2 as long. Ray flowers may be absent or inconspicuous. Disc flowers are orange and produce flat, black, two-awned fruits that cling readily to clothing or fur and may be carried far by animals. Heads enclosed in leaf-like bracts.</p>	<p>Flowers in showy terminal heads that may be more than 2 inches across, with 10-20 drooping, yellow, ray flowers that may be each more than 1 inch long and are conspicuous because of the 3 well-defined teeth at the free end, and ray flowers may produce fertile fruits. Ray flowers are pistillate. Disc flowers are darker yellow and form spherical heads.</p>	<p>Flowers borne in heads from May through November and sometimes into December. Heads are to 2 inches across. White ray flowers number 20-30. They are flat, with 2-3 teeth at the free end. Disc flowers, small, densely crowded into a disc that may be depressed in center. Chromosome number, 36. Fruits small, black and white striped, without parachutes.</p>	<p>Flowers borne in many relatively small heads crowded at branch tips, the whole forming a flat-topped structure. Individual heads are to 1/2-inch across and are yellow with most of the flowers tubular, although there may be some marginal ray flowers. As is usually the case, the ray flowers are pistillate while the disc flowers bear both stamens and pistils.</p>	<p>Flowers are in showy heads arranged along the upper portions of the stem. Heads are to 1 1/2 inch across and are commonly grouped with up to 4 being close together but only one of the cluster seems to be open at one time. Flowers are all alike, blue or white, with notched tips and all may yield fertile fruits, so reproductive capacity is tremendous. Chromosome number 18.</p>
<p>Flowers from July into October and fruits persist to some extent through the winter. Since plants require much moisture, drainage provides one good means of control but cutting before flowering may be effective although the seeds remain virile for long in the soil. Chromosome number is 12. Plants yield readily to mild 2-4-D treatment, with one application.</p>	<p>Chromosome number is 34. Flowers appear in August and through October with fruiting time extending through November. A bitter substance is found throughout the plant but particularly in mature flower heads which, if eaten, creates a strong desire for more. Powdered flower heads used medicinally to stimulate sneezing.</p>	<p>Fresh vegetation in spring makes a delicious salad. Control is possible largely by cultivation and cutting tops before the seeds mature. Seeds are commonly distributed through stable manure. Heads are commonly heavily infested with thrips, small insects that crawl readily when exposed but apparently do not provide an adequate check on multiplication.</p>	<p>Flowering time extends from June through September and fruits are to found into early winter. Chromosome number is 18. Leaves and stems contain drug tanacetin that may be poisonous if eaten by man or domestic animals. However, it has been used in a tea for some purposes. Propagation is by seeds or by division of underground parts.</p>	<p>Flowers from July through October being at the best usually early in the morning. Fruiting time extends from August through the winter or to mid-winter. Fruits are inconspicuous straw-colored, without a conspicuous parachute. Young leaves have some value as a slightly bitter salad plant, but if plants are repeatedly cut and well-watered may be considered good.</p>
<p>Fruits in wool of sheep may cause mechanical injury to skin and serious infections may result. In Africa, the leaves of a related species are made into greens and used as food, but somehow this does not seem to appeal to those who smell our own plant.</p>	<p>Cattle and sheep may develop appetite for plant, the eating of which may cause accelerated pulse, difficult breathing, staggering gait, spasms, sensitiveness to touch and convulsions that may end in death. It is therefore not a desirable pasture plant. It fortunately yields readily to cultivation, drainage, cutting and low concentrated spray of 2-4-D.</p>	<p>One control technique is to salt the rosettes making them more palatable to grazing animals and also weakening the growth of the plants themselves. Young leaves often used as pot herbs. Plants resist 2-4-D treatment rather remarkably, even when treatment is repeated. This is the State flower of North Carolina.</p>	<p>For commercial purposes tops are cut when in full flower in late summer and are dried. 1 acre may yield 1 ton of dried leaves that has had a market value of 20 cents a pound, with the extracted oil worth to 2 dollars a pound. An average acre can be made to yield about 20 pounds of oil. Plant resists 2-4-D strongly.</p>	<p>Roots may be dug just after flowering ceases, then ground, roasted and used as a coffee substitute or as a deliberate adulterant of good coffee. Some prefer it to coffee. During time of war it has been used as a means of extending supply of coffee but this requires imagination at times.</p>



Tansy



Chicory



Oxeye Daisy

(Continued from page 475)
 mixed these types in different ways. Much of this, of course, is academic; but its recognition requires some discipline in orderly thinking, and experience in this field may prove of great value.

It would be worth while to investigate the pollination story in these plants, and to notice that while some of the flowers are wholly pistillate, most of them contain both pistils

and stamens. Usually it will be noticed that the flowers not bearing stamens are borne around the outside of the disc heads of which they are a part. In relatively few of the composites do we find the pistillate and the staminate flowers borne on separate plants, but in the case of the ragweed—where this is the case—the flowers do often have a considerable effect on people living in the neighborhood, and sometimes on the economics of a community. The incidence of hay fever in these areas is commonly conspicuously tied to the seasonal production of large quantities of air-borne pollen, making the com-

munities unfit as retreats for people afflicted with respiratory troubles.

Some of the stories about the botany of these plants may be checked with the simplest of observations, but this is not true of all. It would seem to be obvious that the brilliant color of dandelion blossoms and the presence of bees crawling over dandelion heads might suggest a cause and effect relationship between the visit of the bees and the production of virile fruits. Cytologists who study the details intensively tell us, however, that in many cases no pollination takes place; and yet we all recognize that dandelions are able to produce an abundance of fertile fruits, so it is obviously unwise to jump to a hasty conclusion.

It would be a mistake to conclude that we know all that can, or should, be known about the habits of these plants. In fact, we know little about the time necessary for many of these plants to go through the cycle from fertile seed to fertile seed. Knowledge of this kind might, in many cases, provide us with some of the keys to management.

We used advisedly the term "fertile seed" above, because, to the technical botanist, the "seeds" of all of the composites—like the "seeds" of the grasses and of some other groups—are really one-seeded fruits. So, if you are interested in semantics, the science of meanings, you do not sprinkle sunflower "seeds" on your bird-feeding station, but sunflower "fruits." Apparently many precollege textbook writers are wholly unaware of this.

Perhaps it would be best to conclude this discussion by turning again to the poets. For the most part, poets deal with impressions, not challenges to our intellect, appeals to our pocketbook, or the strains of our backs. Digging weeds requires physical strength. Allowing them to grow in some places affects our bank balance. Understanding their structure, physiology, development and relationships puts demands on the best of brains. But simply enjoying their beauty, and possibly drawing a few far-fetched comparisons, may be relaxing and comforting.

"Even death-doomed men
 However they may lock their brains
 Fall dreaming now and then,
 And see the white-topped daisy-fields
 Go marching up a glen."

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