SOME PLANTS OF KENTUCKY POISONOUS TO LIVESTOCK

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By J.W. Herron, Extension Professor of Agronomy, and D.E. LaBore, Associate Extension Professor of Veterinary Science. Authors' acknowledgments: Information in this publication is based largely on Poisonous Plants of the United States (revised ed.), by W.C. Muenscher, The Macmillan Company, 1951, and Poisonous Plants of United States and Canada, by J.M. Kingsbury, Prentice-Hall, Inc., 1964. The illustrations were made by Mardelle Jones, Gertrude Hanly, and Betty Burrus.1

Poisonous plants are responsible for considerable losses to farmers and stockmen in Kentucky. Many cases of plant poisoning are never diagnosed or even suspected. There are nearly 100 different species of plants growing in Kentucky that under certain conditions may be poisonous to livestock. Only one third of these are likely to cause serious trouble. The primary purpose of this circular is to enable the farmer to recognize, at sight, plants which are known to be dangerously poisonous, and to have some knowledge of those additional plants, which, under certain conditions, may cause trouble.

Recognition of Plant Poisoning

Plant poisoning is often difficult to diagnose, since the symptoms vary with the plant eaten and the poisonous substances it contains. When plant poisoning is suspected, first eliminate the possibility that the animal is suffering from some infectious disease or chemical poisoning from paint, sprays or weed killers left around the farm. Plant poisoning may be suspected when there is a sudden onset of unexplained illness, acute disorders of the nervous system or the digestive tract, loss of weight, difficult breathing, weakness, coma and collapse. There is usually no fever, except in cases of poisoning by dogbanes and bracken. If the animal dies, autopsy finding of identifiable parts of poisonous plants in the animal's digestive tract may lead to a definite diagnosis.

Call a Veterinarian

When plant poisoning in livestock is recognized or suspected, the first thing to do is call a veterinarian, since diagnosis and treatment of a poisoned animal must be done early if the animal is to be saved. Some first aid can be given before the veterinarian arrives. Place the affected animal where it is quiet and comfortable and where diagnosis can be made and treatment given. The treatment will be determined by observing the series of symptoms, and finding what poisonous plant was eaten. Other livestock should not be allowed in the pasture where the poisoning occurred nor fed questionable silage or hay until the cause of the poisoning has been determined.

How to Prevent Plant Poisoning

••Learn to recognize poisonous plants. Study the illustrations and descriptions in this circular until you are familiar with them. Make a thorough survey of your property, wherever stock is turned out to graze. Poisonous plants sometimes occur in the open pasture, but more frequently along fence rows, banks of streams and ponds, and in woodlands. Learn to recognize these plants in their early stages of growth. Cockleburs and some others are poisonous only as seedlings. Send to the Agricultural Experiment Station, University of Kentucky, Lexington, Ky. 40506 for identification any plant that you cannot positively identify, but suspect to be poisonous.

••Don't harvest poisonous plants in hay. Before hay is cut, the field should be carefully examined.

••Avoid overgrazing. Most cases of plant poisoning are closely connected with a lack of suitable

forage. When plenty of grass or hay is available, animals will usually avoid poisonous plants, which are often tough and unpalatable. Larkspur, dutchman's breeches, water hemlock and poison hemlock are particularly dangerous in the early spring. Likewise in the fall, when pastures are dry, animals will eat whatever is available, even trees and shrubs.

Suggestions for Sending Plant Specimens for Identification

••Plants suspected of being poisonous may be sent for identification to the Department of Agronomy, Agricultural Science Building, Lexington, Kentucky.

••When possible, send the entire plant, including leaves, flowers, roots, fruits, and seeds.

••State the general structure or size of the plant, whether herb, shrub, tree or vine, color of flowers, and locality and county where the plant was collected.

••If two or more kinds of plants are sent at the same time, each plant should have a numbered tag attached to it. Fresh specimens should be wrapped in damp paper before mailing.

••If plants cannot be sent in fresh condition, they should be pressed out flat and packed between pieces of cardboard before sending.

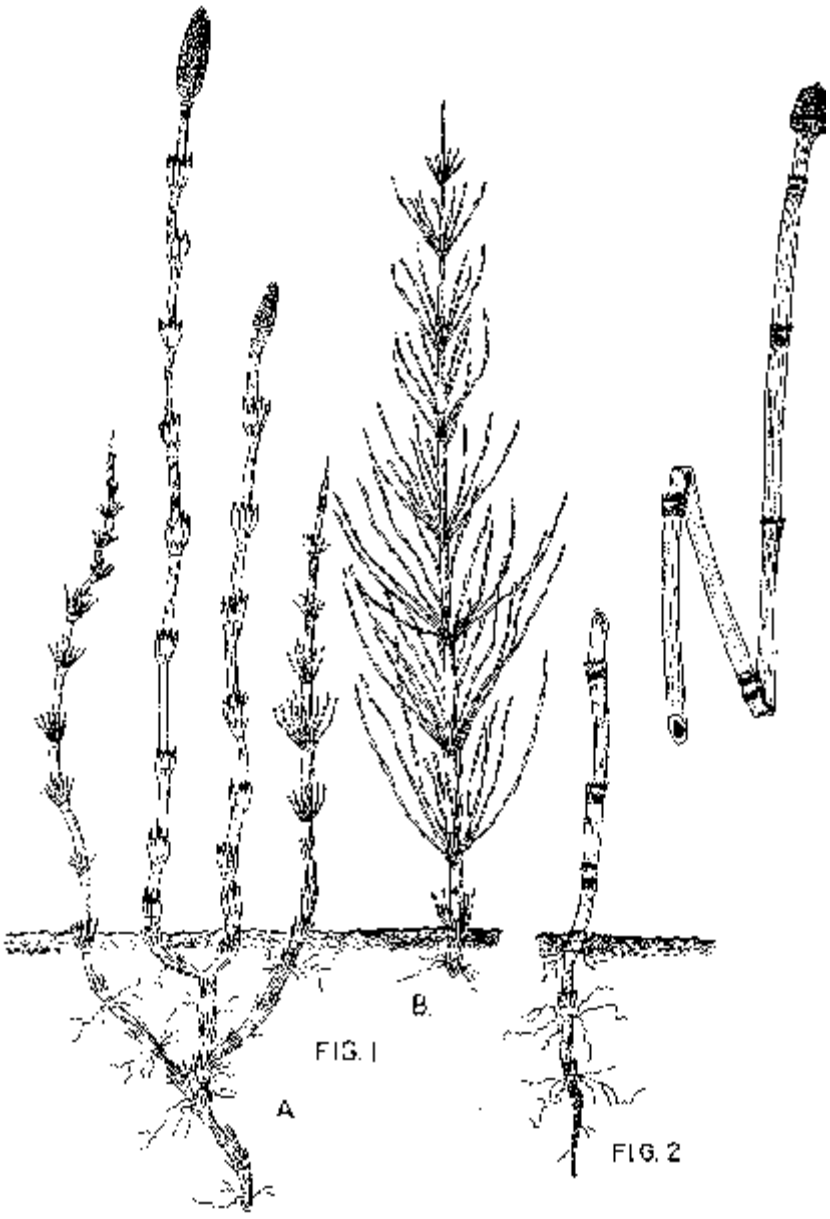

PLATE 1.—Fig. 1. Horsetail, *Equisetum arverse.* A, fertile shoots with terminal cones. B, sterile shoot. Fig. 2. Scouring rush, *Equisetum hyemale.* Evergreen shoot, bearing cone.

Horsetail. Equisetum arvense L. Plate 1. Fig. 1.

Scouring rush. Equisetum hyemale L. Plate 1. Fig. 2.

Horsetail Family (Equisetaceae)

DESCRIPTION. Shoots round, hollow, jointed, of two types, arising from a perennial, creeping, underground rootstock. One type of shoot, tan in color, appears in early spring, and bears the reproductive spores in a terminal, cone-like structure. The other is sterile and appears later, bearing whorls of pine-needle-like branches. Leaves reduced to "teeth" and arranged in whorls around the stem at the joint. Common on sandy, moist soil, in meadows, along roadside ditches, stream banks and railroad embankments.

CONDITIONS OF POISONING. These plants contain, among other toxic principles, aconitic acid, equistitine, and thiaminase. Horses are much more susceptible to Equisetum than cattle.

SYMPTOMS. Symptoms appear suddenly after the plant has been eaten, especially if the plant was in a dried condition. The first symptoms are unthriftiness, weakness, with loss of flesh. Appetite may or may not be affected. In a few weeks a lack of muscle control will be noticeable, and the animal will frequently fall. In advanced cases the symptoms are difficult breathing, pale mucous membranes, rapid and weak pulse, diarrhea, convulsion, coma, and then death.

TREATMENT. In early stages purgatives and stimulants should be given. The animal should be kept quiet, and high quality rations should be fed. Avoid feeding hay containing large quantities of the plant. Treatment with massive doses of thiamine seems to be effective except in advanced cases.

Scouring Rush (Equisetum Hyemale)

DESCRIPTION. Shoots similar, forming long, tapering canelike stalks, 1 to 6 feet high. Stems stiff,

evergreen, with terminal spore-bearing cones. Leaves reduced to "teeth" and arranged in whorls around the stem at the joints. Common in wet localities, thickets, along streams, roadside ditches and borders of swamps, and in mountain sections of the state.

CONDITIONS OF POISONING. Same as Equisetum arvense L.

SYMPTOMS. Same as Equisetum arvense L.

TREATMENT. Same as Equisetum arvense L.

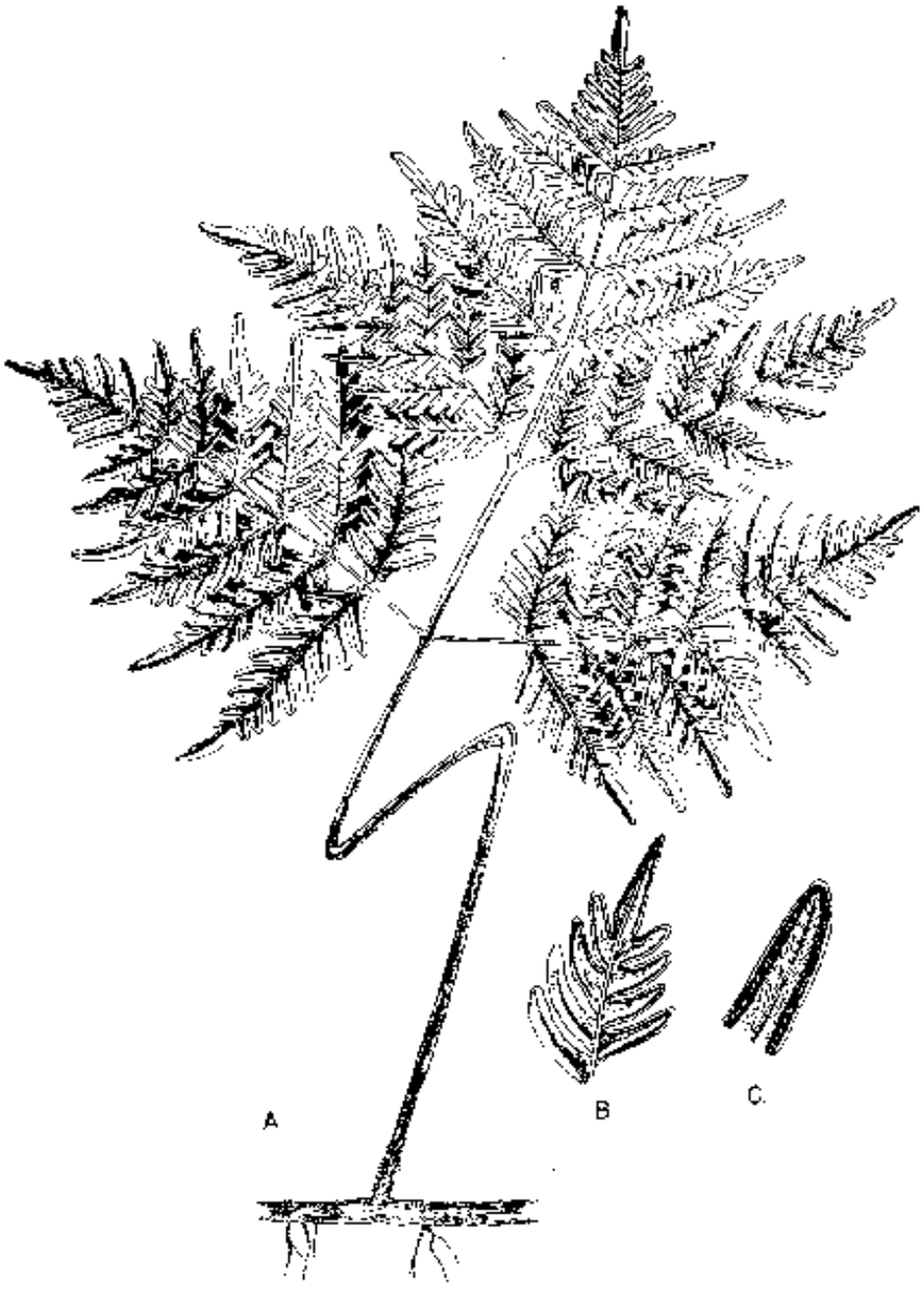

PLATE 2.—Bracken. *Pteridium latiusculum.* A. "leaf" attached to rootstock. B-C. detail showing spore case along marg n on underside of "leaf."

Brake fern or Bracken. Pteridium latiusculum Mason. (Pteris aquilina L.) Plate 2.Fern Family (Polypodiaceae)

DESCRIPTION. Coarse-growing perennial fern, with stout black horizontal rootstock. Frond or leaf broad, triangular in shape, and divided into three main parts, each of which is twice subdivided. Reproduction by spores borne in late summer on the lower edges of the mature fronds.

Common in open acid woodlands and high pastures of the state.

CONDITIONS OF POISONING. Not ordinarily eaten by stock, except during a dry season or in late summer when there is a scarcity of green herbage. Poisonous both fresh and dried in hay, though hogs eat the rootstocks without harm. The chemical

action causing the poison is cumulative and symptoms often do not appear immediately. The toxic material is unknown.

SYMPTOMS. Cattle affected usually have a high temperature, stand with head down and drool at the mouth. There is a rapid loss of flesh along with difficult breathing and excess salivation. Blood appears in the feces, either in bright red clots or as black feces. There is generally a trickle of blood from the nostrils, The mucous membranes will be congested, hemorrhagic or a yellow color. These symptoms may be confused with anthrax.

In horses the first symptom noticed is an unsteady gait. Horses become drowsy, push their heads against solid objects and have difficulty swallowing. From 7 to 20 days after the symptoms are first noticed the animal will "go down." Death usually follows in several days.

TREATMENT. If the condition is diagnosed early enough, some animals will respond to treatment. Saline purgatives, raw linseed oil, mineral oil or melted lard should be given. Thiamine hydrochloride injected intravenously may be of some value.

PLATE 3.—Yew, *Taxus spp.*

Yew. Taxus spp.Yew Family (Taxaceae)

DESCRIPTION. Evergreen shrub. Leaves alternate, needle-like, stiff, 1/2 to 1 inch long, dark green and glossy above and yellow-green on the lower surface. Seeds solitary, born in a cup-shaped, fleshy bright red fruit, appearing somewhat like a red berry.

CONDITIONS OF POISONING. Poisonous properties have been attributed to the alkaloid, taxine, a heart depressant. The leaves, bark, wood and seeds are poisonous. When large amounts are eaten, death may result within a short time. Cattle, horses, sheep, goats, and wild animals have been poisoned by browsing the leaves and twigs. The red pulp of the fruits seems to be harmless, but

seeds may contain the poisonous alkaloid. Poisoning sometimes occurs from livestock eating prunings and droppings. The red fruits are attractive to children.

SYMPTOMS. Large doses usually result in sudden death without additional symptoms. Animals are found close to plants from which they have eaten, frequently with twigs or leaves still in their mouths. In subacute cases, typical symptoms include trembling, labored breathing, and collapse. Spontaneous recovery in subacute cases has been reported, and, in such cases, the time between ingestion and evidence of symptoms may be as long as two days. Gastroenteritis and diarrhea may be evidenced in subacute cases.

TREATMENT. In acute cases, death occurs before any treatment can be administered. In less acute cases, atropine has been reported as an effective treatment to counteract the depressant effect of the alkaloid taxine.

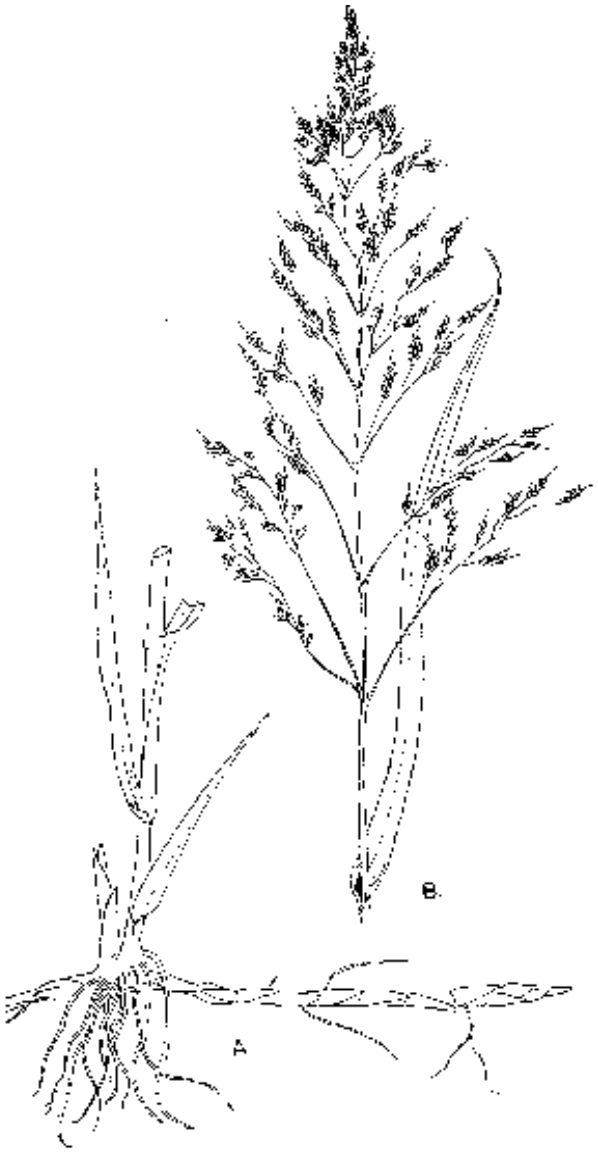

PLATE 4.—Johnson grass. *Sorghum halepense*. A, part of plant showing creeping rootstocks, B, flowering portion of plant.

Sorghum. Sorghum vulgare L.
Johnson grass. Sorghum halpense L. Pers.
Plate 4.
Sudan grass. Sorghum vulgare var. sudanense (Piper) Hitch.Grass Family (Gramineae)
Johnson grass. *Sorghum halpense L. Pers.*
DESCRIPTION. Large perennial, 3-6 feet high, with scaly, creeping rootstalks. Flowers in long, open, terminal panicle.

Sorghum. *Sorghum vulgare L.*
DESCRIPTION.--Very sturdy annual. Tall, coarse grass with flowers similar to Johnson grass.

Sudan grass. *Sorghum vulgare var. sudanese (Piper) Hitch.*
DESCRIPTION. Annual, similar to sorghum, but of more slender growth. Neither sorghum nor sudan grass has scaly, creeping rootstalks.

All three are cultivated as forage crops, but Johnson grass is a weed of considerable importance in Kentucky, since it spreads rapidly into cultivated fields. Once established, it is hard to eradicate because of its underground rootstocks.

CONDITIONS OF POISONING. Normally these grasses furnish excellent forage, and their use

should not be discouraged. Since, under certain conditions, they may be dangerously poisonous, they should never be fed in a wilted or stunted condition to livestock. Cut hay and silage should be cured for at least six weeks before being used. These grasses should never be pastured until they are at least a foot tall; second growth is also very dangerous.

The toxic principle is hydrocyanic acid. Animals are more likely to be poisoned if they drink soon after eating plants of these species. Cattle are more susceptible than horses and sheep.

SYMPTOMS. LethaI amounts of hydrocyanic acid cause respiratory paralysis and spasms, followed quickly by death. Animals are usually found dead before symptoms are noticed.

Smaller doses cause excitement and convulsions; later, depression sets in. Respirations are deep and accelerated at first but become weak and irregular. Pupils of the eyes are dilated and appear glassy. Nostrils and mouth are usually filled with foam. The animal may become bloated and urinate and defecate often. The breath will have an almond odor.

TREATMENT. If treatment is to be beneficial it should be started before respiratory paralysis begins to occur. The best antidotes are either sodium nitrite, sodium thiosulfate or methylene blue, given intravenously. Calcium gluconate may also be helpful.

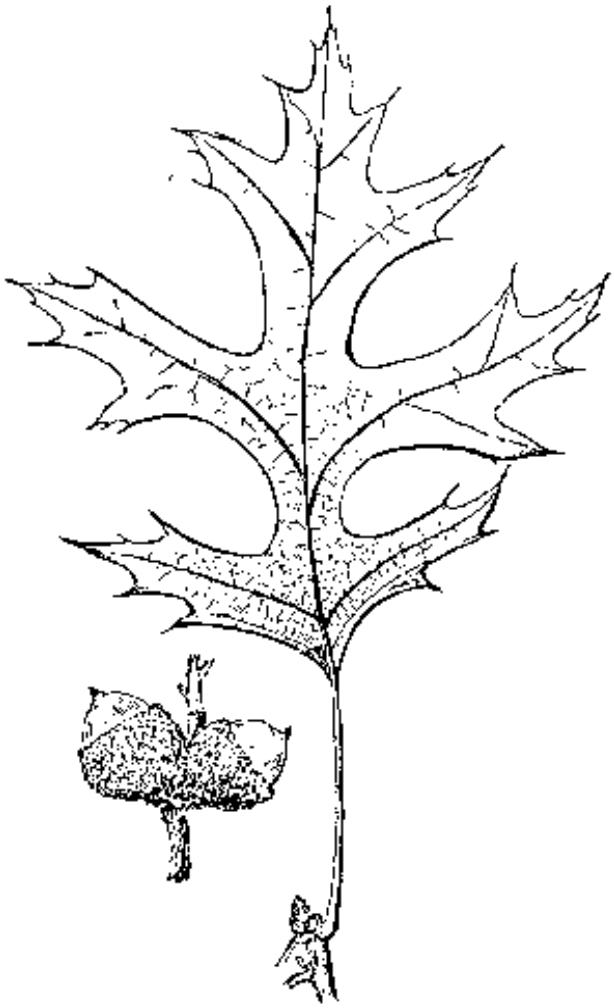

PLATE 5.—Oak. *Quercus spp.*

Oaks. Quercus spp. L. Plate 5.Beech Family (Fagaceae)

Oaks are easily recognized by their fruit-acorns. Nearly all oaks have a leaf that is broad-bladed and deeply cut along the margin, forming sections or lobes. However, there are a few species that have leaves resembling willow leaves. In wooded areas, young oak trees may occur in large numbers.

CONDITIONS OF POISONING.- Oaks seem to be most poisonous in the budding and leafing stages, which occur early in the spring when very little other forage is available. Animals turned into wooded areas before grass becomes abundant may consume large quantities of the buds and young leaves. Small amounts do not seem to be injurious, but when they are a large part of an animal's diet, severe illness can follow, often resulting in death of the animal two weeks to a month later.

Cattle and sheep seem more susceptible to oak poisoning than other animals.
Tannic acid is considered to be the poisonous principle, although experimental feeding of tannic acid failed to produce the condition. Obviously, some other substance may be involved.
SYMPTOMS. Constipation and loss of appetite are early symptoms. The feces are scanty, dry, and often contain mucus and blood. In some cases this may later be followed by profuse diarrhea. The affected animal usually exhibits a gaunt, tucked up appearance. There is evidence of jaundice, and blood or hemoglobin may appear in the urine. The muzzle may become dry and scaly. There is a reluctance on the part of the affected animal to follow the herd and a tendency to remain near water. When forced to move, severely affected animals show evidence of weakness and have a shuffling gait. They later collapse and die. Rarely are more than a few animals in a herd affected.
TREATMENT. Animals grazing wooded areas in the spring should be watched for early evidence of oak poisoning. If it occurs, animals should be moved to other pastures. In early or mild cases of oak poisoning, veterinarians may administer symptomatic treatment with good success. However, for severely poisoned animals no effective treatment is known.

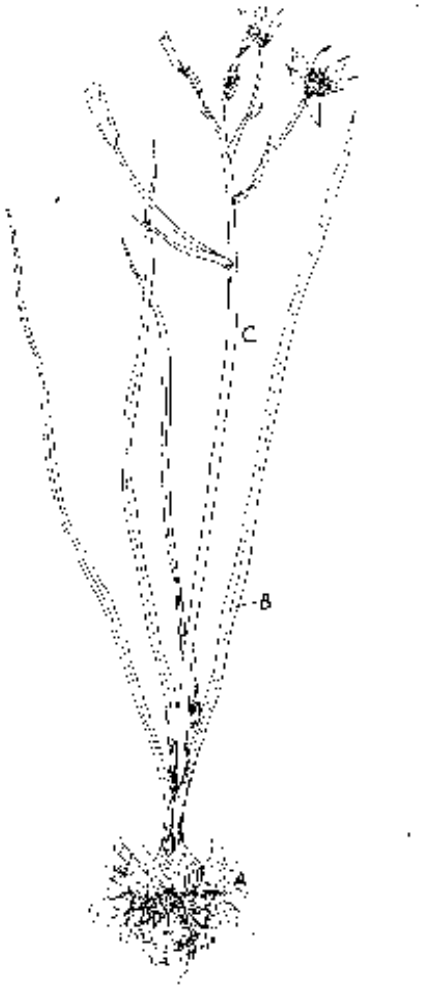

PLATE 6.—Star-of-Bethlehem, *Ornithogalum umbellatum*. A. bulbs. B. leaf showing light green midrib. C. stem with star-shaped flower.

Star-of-Bethlehem (Ornithogalum umbellatum L.) Plate 6.
Lily Family (Liliaceae)
Other common names are snowdrop and nap-at-noon. Star-of-Bethlehem is becoming more common as a lawn weed in Kentucky. It was introduced from Europe, and some people still consider it an ornamental plant. Where star-of-Bethlehem is a weed problem, the plants have escaped from cultivation, and in many cases almost completely crowd out desirable lawn grasses.
DESCRIPTION. Star-of-Bethlehem is a perennial that reproduces mostly by bulbs, rarely by seed. It belongs to the same family as wild garlic (lily family) and may be confused with wild garlic. Star-of-Bethlehem does not, however, have the strong scent of onion or garlic, and the leaves are about as long as the stem and have a light green midrib. The stems develop from small bulbs that are usually in clumps, grow to a height of from 4 to 12 inches, and bear several white star-shaped flowers.
In Kentucky, new growth starts in late January or early February. The plant grows to maturity and

develops flowers in May or early June. The tops then die, leaving brown areas in the lawn throughout the summer.

CONDITIONS OF POISONING. All parts of the plant are poisonous when eaten either fresh or in hay. It is reported to contain uncharacterized alkaloids. The bulb seems to be more toxic than other parts of the plant.

SYMPTOMS. Symptoms include depression, salivation, and bloating.

TREATMENT. No effective treatment known.

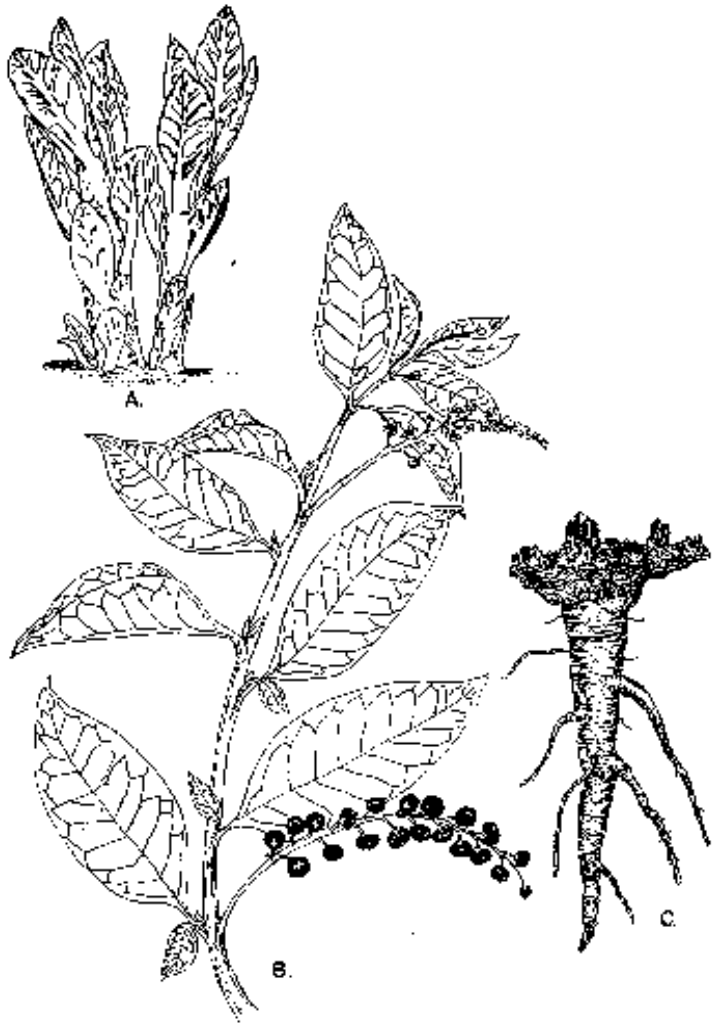

PLATE 7.—Pokeweed. *Phytolacca americana*. A. young shoots, B. part of mature plant with flowers and fruits, C. tap root.

Pokeweed, pokeberry, poke. Phytolacca americana L. Plate 7.

Pokeweed Family (Phytolaccaceae)

DESCRIPTION. TalI, smooth, perennial herb with a large taproot. Stems succulent, purplish, 3 to 10 feet high. Leaves alternate, pointed, narrowly oblong, with smooth margins. Flowers small, white, borne in long, drooping clusters. Fruits flattened, spherical, dark purple berries, usually with ten seeds. Common on recently cleared land, in open woods, pastures, and along fence rows.

CONDITIONS OF POISONING. A saponin-like substance, in addition to the alkaloid, phytolaccine, is present in all parts of the plant, especially the roots and seeds. Cooking destroys the poison and young shoots are sometimes used as cooked greens. Although animals usually avoid pokeweed due to its unpleasant taste, early in the spring they sometimes feed on the young shoots. Cases have been reported of poisoning in pigs from rooting out and consuming the roots of the plant. It has also been reported that in Kentucky cattle were attracted to pokeweed plant treated with certain herbicides, thus causing loss of several animals.

SYMPTOMS. In most cases when small amounts are eaten, the only symptoms are retching and vomiting, usually noticed several hours after the plant has been eaten. If larger amounts are eaten, spasms, diarrhea, and convulsions will be the main symptoms. The cause of death is respiratory paralysis.

TREATMENT. Tannic acid, mineral oil and stimulants will help in most cases if the condition is diagnosed early enough.

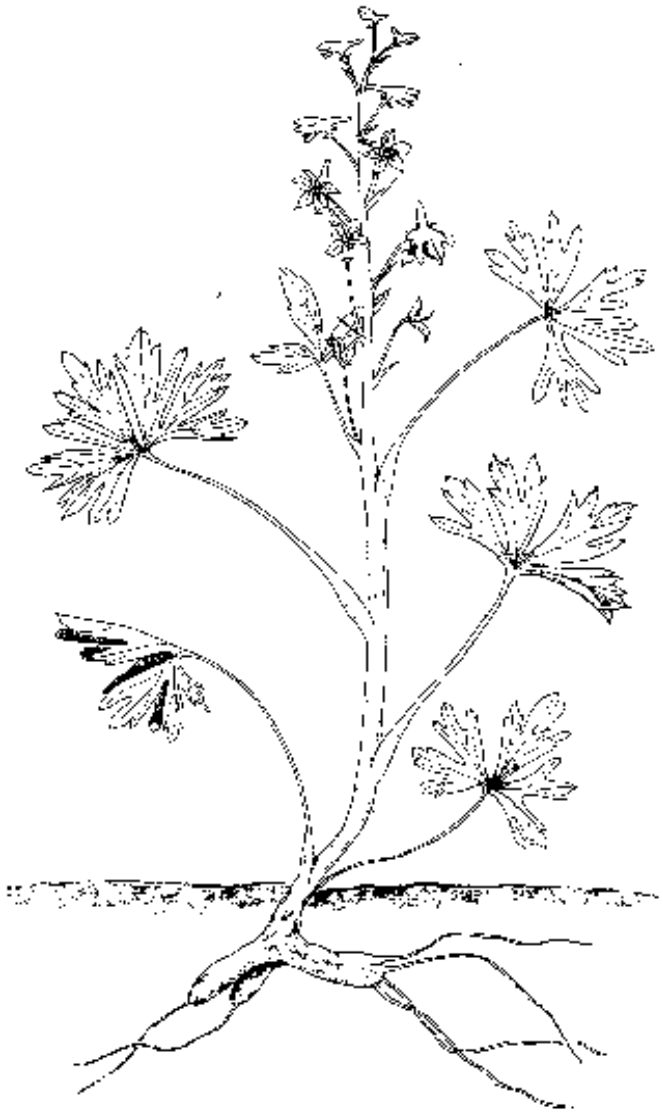

PLATE 8.—Dwarf larkspur. *Delphinium tricorne*. Entire plant, showing flowers, lobed leaves, and tuberous roots.

Dwarf larkspur, staggerweed. Delphinium tricorne Michx. Plate 8.
Crowfoot Family (Ranunculaceae)
DESCRIPTION. Stout perennial, 4-35 inches high. Leaves alternate and very deeply lobed. Flowers spurred, blue or occasionally white, arranged in terminal clusters, appearing in spring. The root is a tuberous cluster.
Commonly found in rich, open woods and along streams.
The annual larkspur (Delphinium Ajacis L.), which often escapes from gardens and establishes itself as a weed ln fields and roadsides, is also poisonous.
CONDITIONS OF POISONING.
Larkspur contains several very poisonous alkaloids, including delphinine, and is most poisonous in the early stages of growth, during April and May. Poisoning occurs when stock grazes in woodland pastures before other green herbage is available. Cattle are the most susceptible, but horses and sheep can be poisoned by eating large quantities.
SYMPTOMS. The symptoms of larkspur poisoning differ according to the amount eaten and the animal's tolerance. Small amounts may cause loss of appetite; excitability, staggering, and constipation. Severe symptoms that develop when an animal eats large quantities are slobbering, vomiting, colic, bloating, and convulsions. Death is due to respiratory paralysis.
TREATMENT. Protect animals from excitement by keeping them in a quiet place and give them such drugs as chloral hydrate or one of the barbiturates. Epsom salts may be given to help the constipation. Other drugs should be given to relieve the animal. It may be necessary to treat the animal for bloat.

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Dutchman's breeches, staggerweed, wild bleeding heart. Dicentra Cucullaria L. Bernh. Plate 7. Fig. 1.
Squirrel corn, staggerweed, wild bleeding heart. Dicentra canadensis. (Goldie) Walp. Plate 9. Fig. 2.Fumitory Family (Fumariaceae)
DESCRIPTION. Delicate perennial with finely cut fern-like leaves. Small yellow pea-like tubers arranged along the underground stem. Flowers 1 to 10, creamy white with 2 short rounded projections,

and arranged on slender stalks.
DESCRIPTION. Closely resembles squirrel corn but small grain-like tubers are clustered at the base of the stem. Flowers with 2 spur-like projections.
Both species are among the earliest of spring plants, blossoming in April or May. Common in rich open woods, often in company with dwarf larkspur.
CONDITIONS OF POISONING. The entire plants of both species contain a number of poisonous alkaloids. Dutchman's breeches is more poisonous than squirrel corn. These plants are unpalatable and are not frequently eaten in harmful quantities when other forage is available. Most cases of poisoning occur in early spring (April or May) when animals are grazing in wooded areas. Cows are more frequently poisoned than horses; sheep are not affected.
SYMPTOMS. A staggering gait and a loss of milk production. Later symptoms are sudden trembling which increases in severity, frothing of the mouth, labored breathing, diarrhea and convulsions. Most animals will recover, if the dosage is not too heavy, and if they are kept away from the plants after the first symptoms appear.
TREATMENT. Animals showing "staggers" in the spring should be moved to clean pastures at once. If poisoning symptoms are severe, purgatives, mineral oil and stimulants may be given.

Wild black cherry. Prunus serotina Ehrh. Plate 10.Rose Family (Rosaceae)
DESCRIPTION. Tree or shrub with slender horizontal branches. Bark of young branches and twigs reddish-brown with prominent white lenticels (pores). Leaves alternate, simple, elliptical, pointed, margins finely toothed, leathery in texture, and usually have a row of hairs on the lower surface along both sides of the midrib. Flowers small, white, in drooping clusters, and produce dark-red to black cherry fruits.
Common along fence rows, roadside thickets, and in rich, open woods. Choke-cherry (Prunus virginiana L.), also poisonous, is of limited distribution in Kentucky.
CONDITIONS OF POISONING. Wild cherries contain the glucoside amygdalin, which, by a series of chemical changes, is converted to hydrocyanic acid. This acid is formed very rapidly in wilted or bruised leaves, particularly those on young tender shoots. Most cases of poisoning occur when animals have access to wilted leaves on branches blown down during wind or hail storms, or branches that have been clipped or pruned.
SYMPTOMS. Symptoms may develop very rapidly after an animal has eaten wilted wild cherry leaves. The poisoned animal becomes uneasy, staggers, and has convulsions. Breathing will be very difficult and the mucous membranes become blue. Death may come so quickly that the animal will be found near the wilted leaves or tree.
TREATMENT. If the condition is diagnosed in time, intravenous injection of sodium thiosulfate and sodium nitrite will save the animal. Calcium dextrose may be helpful. In most cases the animal will be dead before a veterinarian can be called.

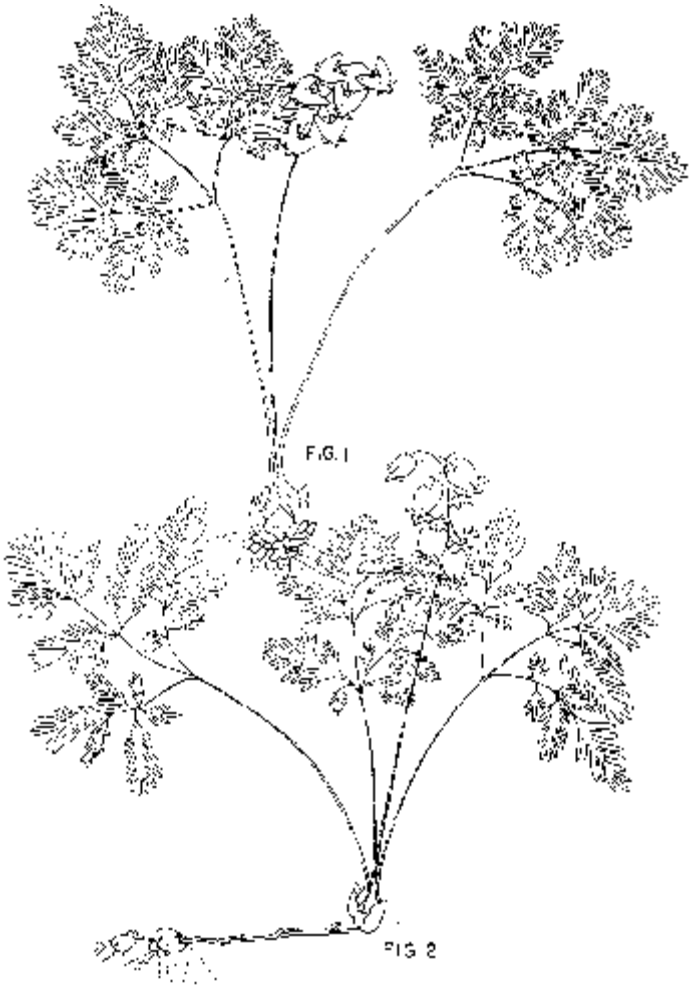

PLATE 9.– Fig. 1. Dutchmans-breeches, *Dicentra Cucullaria*. Entire plant showing leaves, flowers and tuberous roots at base of stem. Fig. 2. Squirrel corn, *Dicentra canadensis*. Entire plant showing leaves, flowers and pea-like tubers scattered along underground stem.

Pulse or Pea Family (Leguminosae)

DESCRIPTION. Moderate-sized tree, often with 2 short spines at base of leafstalk, bark rough. Leaves alternate, pinnately compound; the individual leaflets oval-shaped, without teeth. Flowers creamy white, fragrant, sweet-pea like, arranged in long, drooping,.clusters. Fruit a flat, brown pod, 1/2 inch wide, 2 to 4 inches long, and containing 4-8 small kidney-shaped beans. Common in woods and thickets. Often planted as an ornamental and for erosion control, but has spread widely as a "weed" tree along highways and in waste places.

CONDITIONS OF POISONING. The poisonous substance is a phytotoxin, robin. Animals are affected by eating the young shoots, leaves, pods, seeds, and by gnawing on the bark, or drinking water in which the pods have been soaked. All farm animals are susceptible.

SYMPTOMS. Animals will become stupid, not notice their surroundings, and stand with the legs apart. Heart action is irregular and breathing is feeble, mucous membranes are yellow, and the pupil of the eye dilated. Colic pains may be present and soon followed by diarrhea. Cattle are quite often dizzy and very nervous.

TREATMENT. Death follows the onset of symptoms unless treatment is started soon. An injection of digitalis to help the heart action is useful. Other treatments used are just to help decrease the symptoms and give ease to the animal.

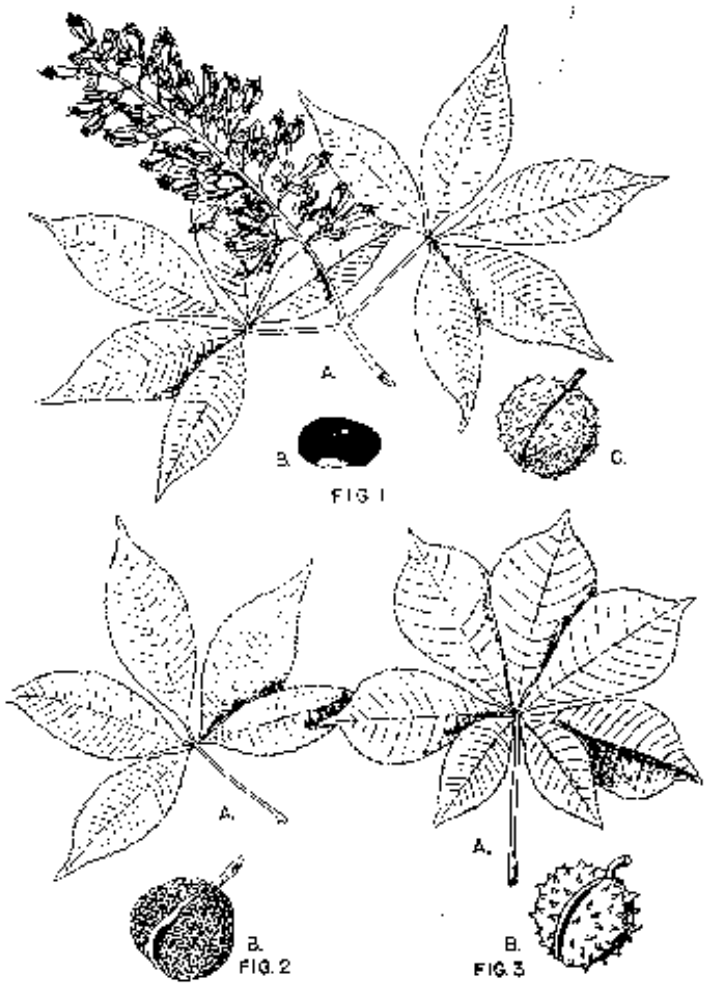

PLATE 12.—Fig. 1. Ohio buckeye. *Aesculus glabra*. A., branch showing leaves and flower cluster. B. seed. C. spiny fruit. Fig. 2. Sweet buckeye. *Aesculus octandra*. A., compound leaf. B. smooth fruit. Fig. 3. Horsechestnut, *Aesculus Hippocastanum*. A. compound leaf. B. spiny fruit.

Horsechestnut. Aesculus Hippocastanum L. Plate 10. Fig. 3.

Sweet buckeye. Aesculus octandra Marsh. Plate 10. Fig. 2.

Ohio buckeye. Aesculus glabra Willd. Plate 12. Fig. 1.Buckeye Family (Hippocastanaceae)

DESCRIPTION. Tree or shrub. Leaves opposite, palmately compound (leaflets arranged like the fingers of a hand). Leaflets usually five. Flowers yellowish, in large clusters at ends of branches. Fruit a prickly capsule (at least when young), leathery, 1 to 3 seeded-each seed glossy brown with a pale scar-hence the common name buckeye. Bark with a strong, offensive odor. Common in rich, moist woods, and along river banks.

DESCRIPTION. Similar to Ohio buckeye, but leaflets usually seven and flowers white.

A cultivated species introduced from Europe and widely planted as an ornamental shade tree.

DESCRIPTION. Similar to Ohio buckeye, but bark with a slight odor, and fruits not prickly. Common in rich, moist woods and along river banks.

CONDITIONS OF POISONING. These plants contain poisonous alkaloids and glucosides, especially in the young shoots, nuts, and sprouts. Poisoning is most likely to occur in early spring in woodland pastures where there are sprouts and seedlings.

SYMPTOMS. Buckeye poisoning affects the central nervous system, causing an uneasy, staggering gait. The animal will be weak, have severe trembling, and may vomit. Mucous membranes will be congested and the pupils of the eye will be dilated. The animal then will go into a coma before death.

TREATMENT. Quite often the animal is found dead before any treatment can be given. If cases are found soon. enough, stimulants and purgatives are indicated.

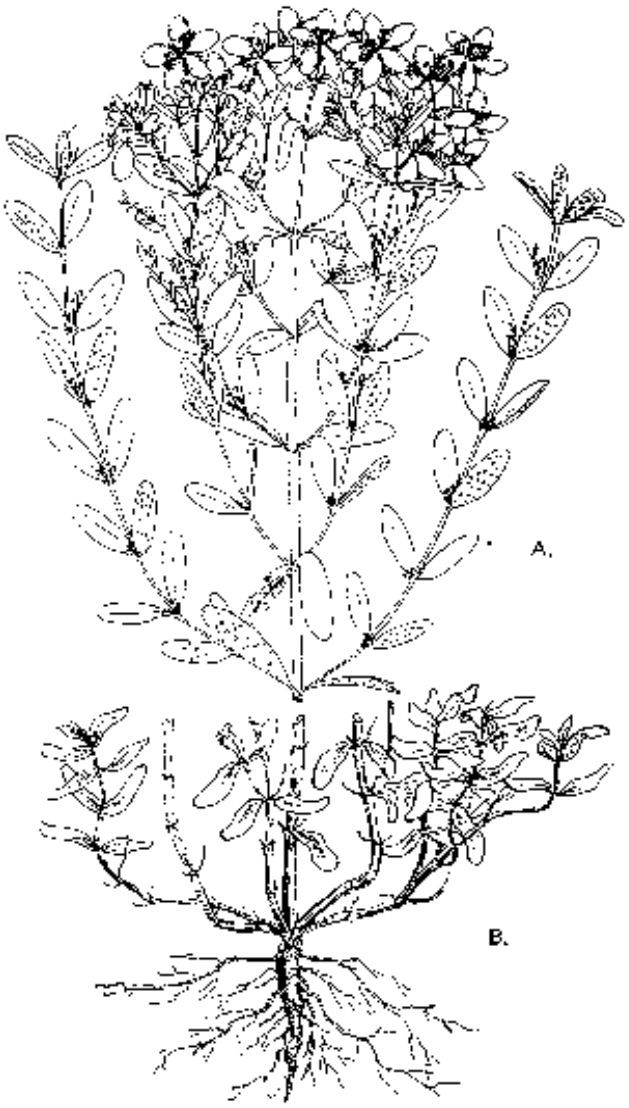

PLATE 13.—St. Johnswort. *Hypericum perforatum*. A. flowering shoot, B. lower part of plant showing shoots and runners.

St. Johnswort, Klamath weed, rosin-rose.
Hypericum perforatum L. Plate 13.
St. Johnswort Family (Guttiferae)

DESCRIPTION. Erect, freely branching perennial, 1 to 3 feet tall. Leaves opposite, less than 1/2 inch wide, oblong or linear in shape, with smooth margins, and covered with transparent dots. Many yellow flowers in somewhat flattened clusters at the top of the,,stem. Petals with black, glandular dots on the margins. The fruit is a three-parted capsule containing many small, dark-brown seeds.

Abundant in old meadows, pastures, wastelands, and along the roadside.

CONDITIONS OF POISONING. The poisonous action of this plant is probably due to two fluorescent substances, hypericin and hypericum red. When white-skinned animals feed on large quantities of St. Johnswort in the flowering stage, their skins may become extremely sensitive to sunlight, a condition called photosensitization. Dark-skinned animals have enough pigment to screen out the undesirable light rays.

Other plants that may cause similar symptoms are alsike clover and buckwheat.

SYMPTOMS. White-skinned animals, animals with white spots or belts, or sheep that have been sheared, quite often develop a dermatitis, the result of light sensitization. The most typical symptoms are skin blisters, falling hair and scabs. The skin may become dry and crack open. Poisoning is rarely fatal. In some cases in sheep, paralysis has been noted.

TREATMENT. Remove animals from the pasture as soon as possible and put them in a cool, dark barn. Apply oil to the affected areas. Supply plenty of fresh water and feed.

PLATE 14.–Poison hemlock. *Conium maculatum*. A. tap-root and young leaves. B. upper portion of plant with finely divided leaves and umbels of flowers and fruits.

Poison hemlock, spotted hemlock, deadly hemlock. Conium maculatum L. Plate 14Parsley Family (Umbelliferae)

DESCRIPTION. Smooth biennial herb, 3 to 8 feet high, with purple-spotted stem and finely-divided compound leaves. Flowers small, white, in umbels, blossom in early summer. Leaves have a rank, disagreeable odor. Poison hemlock can be distinguished from 'Water hemlock by more finely-divided leaves and a long, parsnip-like root.

Extremely common along roadsides, banks of streams, ditches, in fields, and around farm buildings.

CONDITIONS OF POISONING. Poisoning is most likely to occur in early spring when leaves are green and other pasturage is not available. The entire plant is poisonous. Cases of human poisoning have occurred from mistakenly eating the seeds, leaves, and roots for anise, parsley or parsnips. The toxic principle is the volatile alkaloid, coniine. Although drying reduces the coniine content, hay containing the dried plants is not entirely safe.

SYMPTOMS. Poisoning generally appears suddenly, and the owner finds the animal "down." Some of the symptoms that may be noticed are: excessive salivation (slobbering), loss of appetite, muscular weakness or twitching of the muscles, incoordination, rapid pulse and great pain. Death occurs from respiratory paralysis.

TREATMENT. If animals are found and diagnosed early enough, purgatives may be given to empty the digestive tract. Intestinal astringents such as tannic acid are useful. Nerve and heart stimulants may be given.

PLATE 15.—Mountain laurel, *Kalmia latifolia*. A, branch showing flower clusters and thick leathery leaves. B. cluster of capsular fruits.

Mountain laurel, calico-bush, poison laurel. Kalmia latifolia L. Plate 15.
Heath Family (Ericaceae)

DESCRIPTION. Evergreen shrub, 3-9 feet high. Leaves to five inches long, alternate or irregular, leathery, shiny, light green on lower surface. Flowers pink or white, cup-shaped, borne in spring. Common in upland woods, hilly pastures, and on acid soil.

DESCRIPTION. Evergreen shrub or small tree. Leaves alternate, leathery, whitish or rusty on lower surfaces. Flowers bell-shaped, rose-pink to white. Common in damp woods, swamps, and upland areas.

CONDITIONS OF POISONING. Mountain laurel and rhododendron contain a resinous substance, andromedotoxin. Sheep are more frequently poisoned than other livestock, since they are often pastured in areas that are better adapted for the growth of these plants.

SYMPTOMS. In certain sections of the state, quite a few animals are lost each year from eating laurel and rhododendron. If an animal eats 0.2% of its body weight, symptoms may develop. The first symptom is irregular breathing. Later, slobbering at the mouth, grating of the teeth, vomiting, staggering, blindness, stupor, and then death. The meat from these animals should not be eaten. If the animal recovers, several days should elapse before it is used for human consumption.

TREATMENT. If the animals are found early enough, oil drenches, with materials such as mineral oil, raw linseed oil, lard, etc. should be given.

PLATE 16.—Dogbane. *Apocynum cannabinum*. A, part of plant showing opposite leaves with smooth margins, and flowers clustered at end of stems. B, pod with seeds.

Indian hemp, dogbane. Apocynum cannabinum L. Plate 16.Dogbane Family (Apocynaceae)

DESCRIPTION. Branching perennial, 1 1/2 to 5 feet high. Stem contains a milky juice or latex and arises from a vertical underground rootstock. Leaves opposite, oblong in shape, with smooth margins. Flowers greenish-white, borne in clusters at the ends of the stems and branches. Fruit a long, slender pod containing many seeds that bear tufts of "floss." Common in gravelly soil, along roadsides, in fields, meadows and wastelands, often in large colonies.

CONDITIONS OF POISONING. Indian hemp contains the glucoside cymarin, poisonous resins and possibly other toxic substances. All parts of the plant are poisonous, either fresh or dried in hay. As little as 1/2 to 1 ounce of the fresh green leaves can cause death to a cow.

SYMPTOMS. A rise in body temperature, sweating, strong pulse, ears and legs become cold, pupils of the eyes usually dilated, and the inside of the mouth becomes red and sore. Bowel action is frequent. In advanced cases death will usually occur.

TREATMENT. If cases are diagnosed early enough, the stomach should be emptied and gallic or tannic acid given as an antidote. Heart stimulants are sometimes helpful. Keep the animal in a quiet place and give it good feed and water.

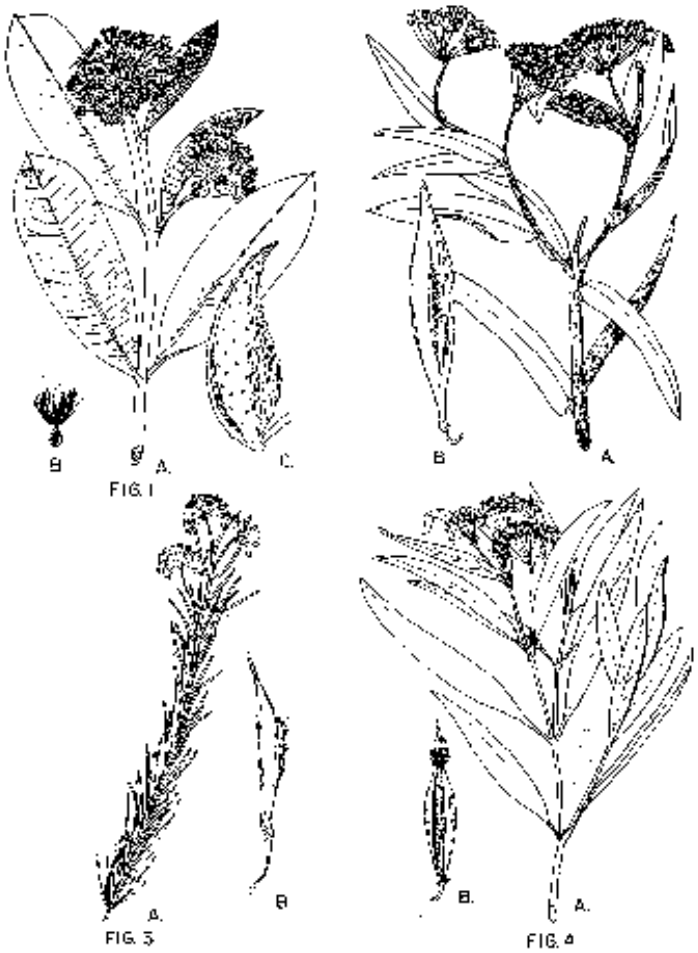

PLATE 17.--Fig. 1. Common milkweed. *Asclepias syriaca*. A. opposite leaves and flower clusters. B. detail of tufted seed. C. opening seed-pod. Fig. 2. Butterfly weed. *Asclepias tuberosa*. A. alternate leaves and flower clusters. B. seed-pod. Fig. 3. Whorled milkweed. *Asclepias verticillata*. A. whorled leaves and flower clusters. B. seed-pod. Fig. 4. Swamp milkweed. *Asclepias incarnata*. A. opposite leaves and flower clusters. B. seed-pod.

Swamp milkweed. Asclepias incarnata L. Plate 17. Fig. 4.
Common milkweed. Asclepias syriaca L. Plate 17. Fig. 1.
Butterfly weed. Asclepias tuberosa L. Plate 17. Fig. 2
Whorled milkweed. Asclepias verticillata L. Plate 17. Fig. 3.Milkweed Family (Asclepiadaceae)

DESCRIPTION. Stems solitary or clustered, 1-5 feet high. Leaves opposite. Flowers pink to rose-purple, arranged in umbels. Fruit a pod containing seeds tufted with "floss."

DESCRIPTION. Erect perennial, 2-4 feet high, stem with broad opposite or whorled leaves and milky sap. Flowers dull pink, arranged in simple umbels. Fruit a pod containing seeds tufted with "floss."

DESCRIPTION. Erect perennial 1-3 feet high, stems with alternate leaves and no milky sap. Flowers bright orange, arranged in simple umbels. Fruit a pod containing seeds tufted with "floss."

DESCRIPTION. SIender perennial, 1-3 feet high. Leaves arranged in whorls, very narrow with curled margins. Flowers greenish-white, in small umbels. Fruit a pod containing seeds tufted with "floss."

Common milkweed, butterfly weed, and whorled mill<**CONDITIONS OF POISONING**. A resinous substance is located in the stems and leaves. The plants are poisonous both fresh and dried. Green plants are rarely eaten because of their bitter, acrid taste. Whorled milkweed is more poisonous than the broad-leaved species. Milkweeds of the western plains of the United States are among the most deadly of the poisonous plants.

SYMPTOMS. The first symptoms are loss of appetite and diarrhea. Later, the animal will stagger, fall and develop paralysis of the rear limbs. Breathing will be labored and spasms violent. Death is due to respiratory failure. Autopsies show congestion of liver, kidneys, heart, lungs and nervous system.

TREATMENT. Sedatives, such as chloral hydrate and the barbiturates are helpful in easing the pain. Mineral oil will be helpful in early stages.

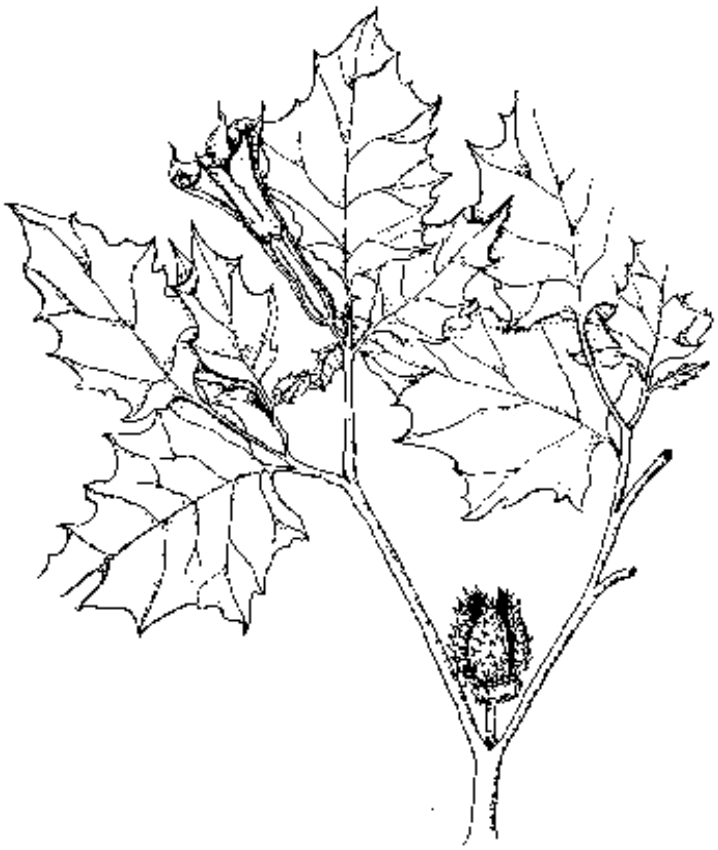

PLATE 18.—Jimson weed. *Datura stramonium*. Branch showing coarsely-toothed leaves, trumpet like flower and capsular fruit.

Jimson weed, thorn-apple, devil's trumpet. Datura stramonium L. Plate 18.
Nightshade Family (Solanaceae)
DESCRIPTION. A stout, coarse annual, 2 to 5 feet tall, with spreading branches. Leaves alternate, coarsely toothed, green or purplish and strongly scented. Flowers trumpet shaped, large, white or purplish. Fruit a hard, spiny capsule that splits into 4 valves at maturity.
Common in cultivated fields and waste places, often abundant in barnyards and abandoned pastures.
CONDITIONS OF POISONING. Jimson weed contains the poisonous alkaloids, hyoscyamine and hyoscine. The entire plant is poisonous, both green and dried. Because of its strong odor and bitter taste, the green plant is rarely eaten. Humans may be poisoned by eating the fruits.
SYMPTOMS. Common symptoms in cattle are rapid pulse and respiration, dry mouth and, possibly, a complete retention of urine, or frequent urination. Diarrhea, dilation of the pupils of the eyes, and stiffness may occur. Close to death, the respirations become slow, irregular, and weak. Death is caused by asphyxia, Quite often this weed grows in the hog lot and may be the cause of some deaths. The main symptom in hogs is convulsive twitching of the entire body.
TREATMENT. If animals are found early enough, mineral oil is helpful, since it acts as a purge and coats the walls of the intestines. Tannic acid is used to precipitate the alkaloids. Stimulants and molasses are helpful.

PLATE 19.—Black nightshade. *Solanum nigrum*. A. entire plant showing leaves, sprawling stems, flower and fruit clusters. B. fruit. C. flower.

Black nightshade, deadly nightshade, garden nightshade, poison berry. Solonum nigrum L. Plate 19.
Nightshade Family (Solanaceae)
DESCRIPTION. Low, branched annual, 1 to 2 feet high, with angular stems. Leaves alternate, oval, thin textured, with wavy margins. Flowers white, in drooping clusters on lateral stalks between the leaves, somewhat resembling tomato flowers. Fruit a berry, green when immature, turning purplish-black at maturity. A common weed in open woods, fields, waste places, and around farm buildings.
CONDITIONS OF POISONING. The alkaloidal glucoside, solanine, is present in the leaves, stems and green berries. The plants are less toxic when dried. Most cases of poisoning occur among sheep, goats, calves, pigs and poultry, as mature horses and cows rarely eat enough to be seriously affected.
SYMPTOMS. The first symptoms are weakness, stupor, staggering gait and constipation, followed by dilated pupils, loss of muscular coordination and sense of feeling. In more advanced cases, cramps and convulsions are typical. The animal will soon die of respiratory paralysis. The progress of the symptoms is often rapid.
TREATMENT. There is no treatment for nightshade poisoning. Sedatives will help stop the convulsions.

fff00020.gif

FIG. 1 FIG. 2

PLATE 20.--Fig. 1. Indian tobacco. *Lobelia inflata*. Entire plant showing alternate leaves, flowers, inflated fruits, and fiberous roots. Fig. 2. Great lobelia. *Lobelia siphilitica*. Upper portion of plant showing leaves and flowers.

Indian tobacco. Lobelia inflata L. Plate 20. Fig. 1.

Great lobelia. Lobelia siphilitica L. Plate 20. Fig. 2Bluebell Family (Campanulaceae)

DESCRIPTION. Hairy annual with leafy branched stem, 1 to 2 feet high. Leaves thin, oval or oblong, with toothed margins. Flowers two-lipped, pale-blue, inconspicuous, borne in the axils of the upper leaves. Fruit a capsule covered by the swollen inflated calyx. Common in meadows, pastures and cultivated fields.

DESCRIPTION. PerenniaI herb to a height of 3 feet. Stem leafy, rather stout, and usually unbranched. Flowers about 3/4 inch long, deep blue, in a dense terminal spike.

Commonly found in roadside ditches, swampy areas, wet pastures, and along the edge of streams and ponds.

CONDITIONS OF POISONING. Poisonous alkaloids and volatile oils are present in the leaves, stems and fruits. In heavily infested pastures or during dry seasons, when other green forage is scarce, animals occasionally eat the plants in sufficient quantities to be seriously poisoned.

SYMPTOMS. Nausea, vomiting and dilated pupils. The animal will stagger, get down, have convulsions, go into a coma and then die.

TREATMENT. Gallic or tannic acid is the best treatment, along with stimulants. Mineral oil is helpful in lining the digestive system.

PLATE 21. White snakeroot, *Eupatorium rugosum*. A, top of plant showing flower clusters and opposite leaves with three prominent veins. B, detail of simple flower cluster or head. C, fiberous roots.

Composite Family (Compositae)

DESCRIPTION. A smooth, erect, perennial herb, 1 to 5 feet high. Leaves opposite, oval, with pointed tips and sharply-toothed edges, strongly resembling the leaves of nettles. The upper surface of the leaf dull, and the lower shiny. Each leaf has 3 prominent main veins on the underside. In late summer the small white flowers appear in compound clusters. Found in woods; damp, shady pastures; and, occasionally, thickets and clearings.

CONDITIONS OF POISONING. Tremetol, a poisonous alcohol, is present in the leaves and stems. This toxic principle may be transmitted through the milk of poisoned cows to humans, causing the disease known as "milk sickness" or "trembles." Animals are usually poisoned during the late summer when forage is scarce. The effect is cumulative. Animals may die from eating a large amount of the plant at one time, or from eating small amounts over a long period of time.

SYMPTOMS. Cows appear listless, have severe constipation, violent trembling, and their breath will become foul with a peculiar acetone odor. Joints become stiff, the animal falls and refuses to rise or otherwise exert itself, grinds its teeth, has rapid, labored breathing, and may die.

In horses, the first stage is general sluggishness, marked depression, and slight incoordination of the muscles, especially of the hind parts. The trembling stage, so characteristic of poisoned cattle, is sometimes absent. An inability to swallow, due to paralysis of the throat muscles, accompanied by a nasal discharge, will show up as the disease progresses.

Human symptoms include severe constipation, vomiting, foul breath, subnormal temperature, weakness, delirium and collapse.

TREATMENT. Since poisoning usually occurs in late summer, cattle should be removed about the first of July from areas infested with this weed.

When the animal reaches the trembling stage, there is little you can do. Strong purgatives will help eliminate the drug from the digestive tract. Stimulants and calcium gluconate are helpful. Keep the cow milked out to eliminate the poison, but do not use the milk for human consumption.

PLATE 22.—Fig. 1. Sneezeweed. *Helenium autumnale*. Top of plant showing alternate leaves, heads of flowers and winged stems. Fig. 2. Bitterweed. *Helenium tenuifolium*. Entire plant showing leaves and flowers.

Sneezeweed, staggerwort, swamp sunflower. Helenium autumnale L. Plate 22. Fig. 1.
Bitterweed, narrow-leaved sneezeweed, yellow dog-fennel. Helenium tenuifolium Nutt. Plate 22. Fig. 2.
Composite Family (Compositae)

DESCRIPTION. Erect-growing coarse perennial, 2 to 6 feet tall, with narrowly-winged stem. Leaves alternate, lance-shaped and coarsely toothed. Flowers yellow, resembling small sunflowers. Toothed ray flowers are characteristically turned downwards. Another species, the purple-headed sneezeweed (Helenium nudiflorum Nutt:) is less present in the state. Commonly found around water holes, streams and ditches, and in swampy pastures and meadows.

DESCRIPTION. Annual, 1-2 feet high, with fine, narrow leaves. Flowers similar to sneezeweed.

Usually found in fields, pastures, cultivated areas, and around farm buildings. Extremely common in western Kentucky.

CONDITIONS OF POISONING. Most cases of serious poisoning occur in the late summer and early fall when the plants come into bloom. Sheep, cattle and horses are susceptible. Most livestock avoid these plants, but individual animals may eat sufficient quantities to cause death. The plants are poisonous either fresh or cured in hay. Cows grazing on these plants may produce milk with a bitter flavor.

SYMPTOMS. Rapid pulse, restlessness, difficult breathing, and loss of muscular control followed by plunging and staggering blindly. At this time the animals are extremely sensitive to the touch. After eating large quantities of the blossoms, the animals may die suddenly with spasms and convulsions.

TREATMENT. If the milk is bitter or the animal is showing symptoms of poisoning, remove all the stock to clean, weed-free pastures. Melted lard or mineral oil is helpful if given early enough.

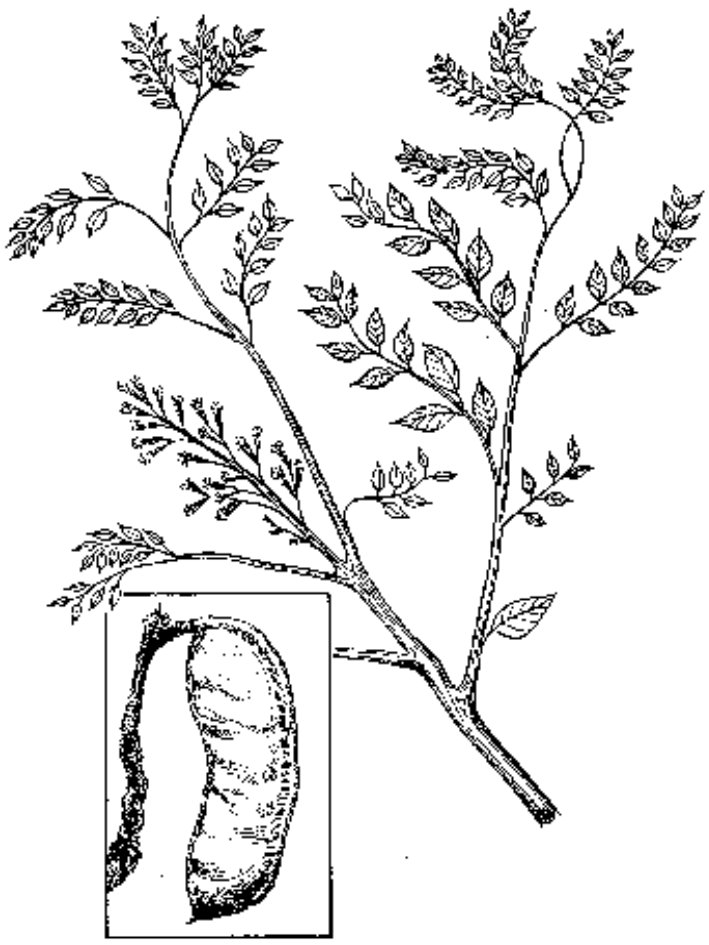

PLATE 24.—Kentucky Coffee Tree. *Gymnocladus dioica.*

PLATE 23.—Cocklebur. *Xanthium orientale.* Mature plant showing the prickly burs.

Cocklebur, clotbur, sheep-bur. Xanthium orientale L. (X. commune Britt.) Plate 23.Composite Family (Compositae)

DESCRIPTION. Branching annual, 1 to 3 feet high. Stems angled, sometimes red-spotted. Leaves alternate, hairy, rough in texture, somewhat heart-shaped, and variously toothed and lobed. Flowers inconspicuous, of two kinds-those in terminal spikes produce only pollen, while those in clusters in the axils of the leaves produce the seed. Fruit a hard, oval, prickly bur, about 3/4 inch long, containing two seeds. The seedlings have small strap-shaped leaves, 1/4 inch wide and 11/4 inches long, and later produce the more characteristic leaves. They sprout from the buried burs. Several species of cocklebur are common in Kentucky. They differ in the shape and hairiness of the bur, but all are poisonous in the seedling stage.

Common in waste places, cultivated fields, along roadsides, beds of dry ponds, and on overflowed lands along streams.

CONDITIONS OF POISONING. The poisonous substance is a glucoside, xanthostrumarin, found in germinating seeds and young seedlings. Since the toxicity decreases as the plants develop, the mature plant is probably non-poisonous. Hogs are most frequently poisoned, but cattle and sheep are also susceptible. Mature plants are seldom eaten, but the ripe spiny burs may result in purely mechanical injury.

SYMPTOMS. Depression, often accompanied by nausea and, occasionally, vomiting. The affected animal becomes gaunt, weak, and unable to stand, has labored respiration and a rapid, weak pulse. It may lie on its side and move its legs in a running fashion until completely exhausted. Within 24 hours after eating 0.75% of its own weight of young seedling plants, the animal may show signs of poisoning, and even die. If death does not occur, several weeks will pass before the animal is back to normal.

TREATMENT. Give emergency treatment with fatty substances, such as mineral oil, cream or even whole milk, by mouth or through a stomach tube. Keep the animal quiet and warm.

Kentucky coffee tree. Gymnocladus dioica L. Koch. Plate 24.

Pulse or Pea Family (Leguminosae)

DESCRIPTION. A large tree with rough bark, ranging from 60 to 80 feet in height. The trunk, which is relatively short and 1 to 2 feet in diameter, divides into numerous large branches that end in contorted, stout twigs. The leaf is twice pinnately compound, being made up of a hundred or more separate oval leaflets arranged on branches of the rib. Its fruit is a flat, leathery pod, 4 to 6 inches in length, containing 4 to 7 hard, flat, dark brown seeds. Pods often remain on the tree until late winter. The tree usually grows on rich bottom land and along streams, scattered among other trees.

CONDITIONS OF POISONING. Poisoning is apt to occur in late winter or early spring when other forage is scarce and animals eat quantities of the pods and seeds lying on the ground, or nibble on young shoots. Cases of poisoning from Kentucky coffee tree are not common, but they may be fatal. The poisonous principle is said to be an alkaloid known as cytisin which is found in the leaves, pods, and seeds.

SYMPTOMS. These have not been well described, although, in reported cases, animals seemed to show evidence of severe pain shortly after feeding on leaves and pods. Profuse diarrhea with straining has also been reported. At autopsy of these animals, a white, sticky mucus was present in the small intestine with congestion of the mucous membranes, and foamy fecal matter was found in the large intestine.

TREATMENT. There is no specific or reliable treatment. Veterinarians may give symptomatic treatments that have proved valuable in other plant alkaloid poisonings. However, recovery will depend largely on severity of the poisoning.

Supplementary List of Poisonous Plants

Many of the species listed below are of limited abundance and distribution in Kentucky. Others are so distasteful that they are rarely eaten, while still others contain so little toxic substance that very large amounts are necessary to cause serious poisoning. A few cultivated species are included. Although generally less troublesome than the plants previously discussed, the species listed here should not be overlooked when confusing cases of poisoning are encountered.

Ergot (Claviceps purpurea (Fr.) Tul.)

Ergot is a fungus or mold that grows in the flower heads of various grasses, perhaps most frequently on rye and redtop. It produces a hard black kernel in the place of the seed. Animals may be poisoned by eating ergot-infected grain or by grazing on infected grass. The poisoning may be acute if large quantities of ergot are eaten at one time, or the results may be slow and cumulative if small amounts are eaten regularly. Symptoms include abortion in pregnant animals, gangrenous conditions, muscular trembling and incoordination, dullness and depression. The ergot (Claviceps paspali S. and H.) that occurs on Dallis grass and other native species of Paspalum is also poisonous, causing characteristic nervousness and trembling.

Jack-in-the-pulpit, Indian turnip (Arisaema atrorubens (Ait.) Blume)

Plants of this species are more common in the mountain and wooded sections of the state. Poisoning may occur from eating large amounts of the fresh leaves and corms. Animals usually avoid them because of their bitter, acrid taste. Symptoms are those of intestinal inflammation and colic. Burning sensations in the mouth and throat will cause the animals to drink constantly.

Hemp, marijuana (Cannabis sativa L.)
A weed around fields where it was formerly cultivated as a crop. Hemp is not ordinarily eaten by animals, but may be consumed in sufficient quantity to cause narcotic poisoning.

Buttercup (Ranunculus spp.)
All animals may be poisoned by eating the fresh plants.

Moonseed (Menisperum canadense L.)
A climbing vine, with small clusters of grape-like fruits that are poisonous to humans.

White sweet clover (Melilotus alba Desr.)
Yellow sweet clover (Melilotus officinalis L. Lam)
Sweet clovers are valuable forage crops and can be used freely as pasture, but poisoning may occur when livestock are fed exclusively on spoiled sweet clover hay or silage. Poisoned animals show symptoms of hemorrhage with marked swellings on various parts of the body, and may bleed to death at calving time or from such minor operations as castration or dehorning. Treatment consists of transfusions of normal blood to restore the blood clotting powers.

Alsike clover (Trifolium hybridum L.)
Animals should not be grazed on this clover when it is wet or dew-covered. Under certain conditions alsike clover may affect white-skinned animals by making them light sensitive. See page 27 for a discussion of photosensitization.

Spurges (Euphorbia spp.)
Livestock may exhibit symptoms of digestive irritations and weakness if fed for an extended period of time on hay containing spurges. Severe blistering of the skin may result from contact with the milky sap.

Castor bean, castor oil plant (Ricinus communis L.)
Commonly grown as an ornamental, this plant often persists as a weed in fields and along roadsides. All parts of the plant are poisonous. Symptoms are nausea, vomiting, thirst, dullness of vision, and convulsions. Severe cases of poisoning may result from eating large quantities, and may cause death.

Hogwort, wooly croton (Croton capitatus Michx.)
Animals are sometimes affected from eating hogwort with hay. Symptoms are diarrhea, colic and general nervousness.

Boxwood (Buxus sempervirens L.)
Although grown extensively as an ornamental hedge, clippings and branches may produce fatal results if eaten.

Climbing bittersweet (Celastrus scandens L.)
A woody vine with attractive clusters of red and orange berries. Leaves and fruits are poisonous. Bittersweet acts both as a heart poison and purgative, producing nausea and prostration.

Ground ivy, Gill-over-the-ground, Creeping Charlie (Glechoma hederacea L.)
Common in lawns, neglected fields and fence rows. Mildly poisonous if large quantities are eaten fresh

or dried in hay.

Blue nightshade, European nightshade (Solanum dulcamara L.)
Resembles black nightshade, previously discussed, except that the leaves are lobed at the base and the berry is red instead of black when mature. The leaves and fruits are toxic.

Horse nettle, bull nettle (Solanum carolinense L.)
Prickly coarse-stemmed perennial, 8 inches to 2 feet high. Common in pastures and cultivated fields. Animals ordinarily do not eat these weeds unless harvested in hay. Chronic poisoning with symptoms of general unthriftiness may result from prolonged eating of small quantities. If a considerable quantity is eaten within a few hours, digestive disturbances, sleepiness and paralysis may occur.

Tobacco (Nicotiana Tabacum L.)
Although usually not eaten by livestock, a few cases of poisoning have been reported.

Matrimony vine (Lycium halimifolium Mill.)
Frequently escapes from cultivation. Leaves and young shoots may be poisonous.

Buttonbush (Cephalanthus occidentalis L.)
A shrub, found in moist, swampy areas. The fruits resemble the buttonballs of the sycamore tree. Most poisoning occurs when animals have eaten the leaves.

Elderberry, black eider (Sambucus canadensis L.)
Common shrub in fields, along fence rows and at the edge of woods. Leaves opposite, pinnately compound. Numerous small white flowers in large clusters develop into purple-black berries. Most cases of poisoning occur when animals eat, the new growth in the spring. Symptoms and treatment are similar to those for wild black cherry. (See page 21).

Ragwort, groundsel (Senecio spp.)
Small herbaceous plants, in wet swampy meadows and pastures, producing yellow, daisy-like flowers in early spring. Plants consumed in large quantities, either fresh or in hay, may affect livestock.

Plants Causing Mechanical Injury
Numerous plants that are common in Kentucky but not poisonous possess sharp awns, burs, or spines which may cause mechanical injury to animals. Examples are the tearing of the flesh around the eyes and mouth; crippling, resulting from getting into hooves; or ulcerous conditions or hair balls in the digestive tract. A few of the most common plants in this category are: barley and wild barley (Hordeum spp.), burdock (Arctium minus), downy brome-grass (Bromus tectorum), foxtails (Setaria spp.), Russian thistle (Salsola Kali L. var. tenuifolia Meyer), sandbur (Cenchrus pauciflorus), spring amaranth (Amaranthus spinosus) and thistle (Cirsium vulgare).

Glossary
Alkaloid. Plant substance, often poisonous, containing a basic nitrogen grouping in its formula.
Alternate. Of leaves: placed singly at each joint, contrasting with opposite and whorled arrangement.
Annual. Of plants: completing its growth in a single year or season.
Asphyxia. Death due to deficiency of oxygen.

Astringent. Agent which causes the constriction of the tissues by direct action.
Calyx. The outer, usually green and leaf-like part of a flower.
Capsule. A dry fruit that splits, at maturity, into 2 or more valves.
Compound leaf. One which is divided into separate leaflets.
Dilated. Of eye: pupil widened or enlarged.
Frond. The "leaf" of a fern.
Glucoside. A plant substance, often poisonous, which by chemical reaction with water yields a sugar.
Head. Type of dense flower cluster found in the composite family.
Herbaceous plant. One which develops no woody stem and is more or less soft and green throughout.
Leaflet. One of the divisions of a compound leaf.
Opposite. Of leaves: two leaves at each stem joint.
Palmate. Of a compound leaf: having the leaflets radiating from a common point.
Perennial. Of plants: continuing to live longer than two years.
Pinnate. Of a compound leaf: having the leaflets arranged on each side of a common axis.
Saponin. A substance found in plants, often poisonous, which is characterized by its property of producing a soapy lather.
Spore. The reproductive body in such plants as ferns and horsetails.
Sterile. Not producing seeds or spores.
Symptomatic. Of treatment: according to the symptoms of the disease.
Terminal. Growing at the end of a branch or stem.
Toxic principle. The poisonous substance in a plant.
Umbel. Type of flower cluster in which the flowerstalks arise from the same point like the ribs of an umbrella.
Whorl. Of leaves: having more than two leaves at each stem joint.