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AGRICULTURAL EXPERIMENT STATION

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POISONOUS PLANTS OF WYOMING

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*On leave.
Poisonous Plants of Wyoming

O. A. Beath

Poisonous plants, while confined to certain areas of Wyoming, are nevertheless responsible for losses of considerable magnitude among stockmen. Available statistics are lacking, but, from an estimate based upon losses in several localities, it seems probable that the average must be as great as three per cent. As would be anticipated, there is a considerable variation from year to year not only in aggregate losses, but in the classes of stock affected. Many deaths, due to unascertained causes, are difficult to diagnose, inasmuch as certain diseases produce symptoms closely related to those of plant poisoning.

As the area of the stock ranges becomes more and more restricted, the successful raising of live stock is certain to become more difficult, especially in districts where poisonous plants occur. In the past, the first suggestion of trouble has been the finding of dead carcasses and then "poison weed" was given as the cause, although no particular weed was, perhaps, suggested. During the last few years, there has been a very creditable advance made by stockmen in attempting to get acquainted with the troublesome weeds. While the number is comparatively large, yet those known to be persistently dangerous are far less numerous than ordinarily supposed. Through inability to recognize those that are detrimental, many owners suffer losses year after year, thinking that some other cause is responsible. The need, therefore, of a simple illustrated bulletin, giving the general location, period of activity, symptoms, etc., of the principal poisonous plants has been felt for some time. It is hoped that the information found herein will be a means of developing a keener interest in the general understanding of the poisonous plants of Wyoming. From whatever angle the problem is viewed, one is confronted with several difficulties. The varied distribution of the plants, the character of the poisons involved, and the methods of treatment under range conditions, are in themselves problems which require at all times
the best efforts of specialists on the one hand, cooperating with the stockowners on the other, to reduce losses to a minimum.

**Contributory Causes.**

Contributing factors incidental to plant poisoning are indeed numerous. Ordinarily, plants are protected from animals through various sources, such as unpleasant odor, acrid or bitter taste, toxic character, and in some cases such protective devices as spines. The depraved appetite for unusual and unappetizing plants is a factor of importance. In the early spring, animals are often tempted to eat those plants which appear palatable and succulent regardless of their toxic or poisonous nature. There are several poisonous plants which usually appear before the range grasses begin to freshen. Among the more conspicuous ones may be mentioned species of larkspur and death camas. In this connection, a condition frequently prevails which is difficult to avoid, and this is the late snowfall, which leaves the more advanced plants exposed. Naturally, the desire to obtain something green is in-
nstitively followed, and many times these outstanding, attractive plants prove to be the animals' only choice. In a state of nature, animals, as a rule, avoid plants of a toxic nature, whereas imported stock, and particularly those better bred, are more often poisoned because they do not easily acquire the habit of "rustling". Sheep are especially variable in their choice of plants, not only individually in the flock, but from day to day.

The susceptibility of different species of livestock is a factor of considerable importance. One species, e.g., the pig, may readily throw off plant material (poisonous), while another, e.g., the horse, may be unable to do so, and hence be more seriously affected. Aside from the individuality and susceptibility of an animal, one finds that its physical state and the condition of the range greatly affect the actual losses from injurious plants. During the spring and early summer of 1920, cattlemen of the state lost an unusually large number of cattle from larkspur poisoning. Two reasons may be advanced for this loss: first, the cattle were, generally speaking, poor and consequently low in resistance; second, the larkspur appeared early and afforded about the only kind of available food. The aggregate loss resulting, therefrom, was surprisingly large.
The importance of the fatigue factor when taken into consideration with plant poisoning is too little emphasized, in our literature. The writer has observed cases of poisoning on the range from plants which, when fed in a corral, proved to be entirely harmless. The circumstances usually noted in the above cases were: scant vegetation, animals fatigued and hungry from long drives, and a new range environment.

The one-night camp for sheep is desirable in dangerous areas. The shortage of feed that naturally results in the immediate vicinity of a more or less permanent camping ground of necessity tempts sheep to eat injurious plants that ordinarily would not be touched. The bedding out system appears to be practical and has many advantageous features other than eliminating hunger by unnecessary trailing.

A precaution not always heeded is that of an adequate salt supply. Range observations supplemented with actual tests have definitely proved that animals, and particularly sheep, are likely to acquire a depraved appetite for toxic plants if not given sufficient salt.

**Important Poisonous Plants.**

The principal poisonous plants of more or less general distribution may be classified into two groups: First, those that occur rather generally distributed and in large quantities over the state; second, those found locally and in more or less restricted areas. In the former, would be included certain species of loco, the larkspurs, certain species of death camas, water hemlock, the lupines, and arrow grass. In the latter group, one would probably include certain vetches, woody aster, aconite, *Psoralea tenuiflora*, milkweed, and *Corydalis aurea*. Probably in discussing poisonous
plants, mention should be made of the fact that forage plants are sometimes infested with fungi, such as rusts and moulds. These may be the cause of the poisoning when found on forage which is ordinarily entirely harmless.

Certain stock losses occur from time to time which are indirectly caused by non-poisonous forms of vegetation. Fatalities in these instances are produced through mechanical injuries and disturbances such as abrasions, compaction, bloating, etc. Sores caused by foxtail may, in addition to being painful, be the source through which infectious bacteria enter the blood stream. The woody tissues of the common greasewood are, under certain conditions, quite difficult to digest. If a considerable quantity is eaten at one time, it may gradually accumulate into a compact mass and subsequently ferment. Bloating quite frequently follows this condition.

Preventive Measures.

The question is frequently asked how may losses be prevented if animals are to be grazed where poisonous plants occur. Unfortunately, prevention cannot be obtained by vaccination, as is the case with several of the infectious diseases. Perhaps a partial answer would be to acquire accurate information relative to range stock and range conditions. Even then, some stock-owners would be forced to meet the problem with considerable uncertainty. The fact that a certain class of stock may have grazed upon the same range for a number of years and escaped trouble gives no assurance that poisoning may not occur. On the other hand, it should be borne in mind that animals, as a rule, do not instinctively select toxic plants as a forage, that all classes of livestock are not necessarily susceptible to the same poisonous plants, that not all poisonous plants are dangerous from their initial appearance on to maturity and that only in one or two instances do animals acquire a depraved appetite for harmful plants. Poisonous plants in most cases, grow in abundance only in limited areas, and, consequently, if one is familiar with the virulent stage of their growth and the kind of stock they affect, losses may be greatly reduced through the application of controlled methods of grazing.
PLAINS LARKSPUR (Delphinium geyeri Green): In this species the stems rise from among a tuft of root-leaves and soon develop open clusters of blue flowers, as seen in the illustration. The parts of the seed capsule have spreading tips. This is the larkspur known as "poison weed" and this name should not be applied to other larkspurs or to any other plants.
PLAINS LARKSPUR.

This species of larkspur is the most common of the Wyoming larkspurs. It is responsible for more losses among cattle than are all the other poisonous plants of the state combined. Under favorable conditions of growth, dense patches may be found which add much to the picturesqueness of the landscape. The average height of this larkspur is about 15 inches.

Where it grows. Found quite generally distributed over the state at altitudes varying from 4,000 to 8,000 feet. It thrives best on a rather coarse, well drained type of soil. This plant grows only in open areas on the plains and foothills.

When it appears. It appears, as a rule, early in May, and generally is in full bloom by the middle of June. After the flowering stage, unless the season is especially moist, the plants dry up rapidly and disappear from the range.

Animals affected. Larkspur poisoning is confined almost exclusively to cattle, while sheep appear to be immune. Horses and mules seldom eat large enough quantities to produce poisoning.

Poisonous period. Dangerous throughout its growth. Poisoning is due to a definite active principle, occurring mostly in the leaves. As a general rule, more losses occur during the early stage of the plant's development. Occasionally cattle prefer the flowering larkspur tops, even if good forage is available.

Symptoms. Symptoms vary more or less, depending largely upon the severity of the poisoning. Those most characteristic are: inability to walk without staggering or falling, nausea, salivation, pronounced sweating, bloating (quite common in the later stages), muscular twitchings of the sides and legs, and frequently convulsive movements. The immediate cause of death is due to respiratory paralysis.

Treatment. Where prevention cannot be strictly carried out, the treatment recommended by the Bureau of Animal Industry undoubtedly is the most effective. (See low larkspur.)
TALL LARKSPUR (Delphinium barbeyi Huth.): Attention is called to the stoutish stems, the coarser and fewer leaves and the dense cylindrical cluster of deep-blue flowers.
TALL LARKSPUR.

This species of tall larkspur is the most common of the larkspurs found growing at the higher altitudes. It is a very poisonous plant, but fortunately its restricted growth in forest reserves, coupled with the fact that in many instances sheep only are grazed where the plants occur, very materially lessens stock losses. As in the case of the plains larkspur, there are areas where the tall larkspur forms dense patches. The height of this plant varies from 2 to 5 feet.

Where it grows. Occurs in all the National Forests of the State at altitudes ranging from 8,000 to 11,000 feet. It thrives best in open draws and mountain parks.

When it appears. Usually appears by the middle of June. The time of blooming varies naturally with the season and altitude.

Animals affected. Same as other species of larkspurs.

Poisonous period. Dangerous from its appearance until the flowers disappear. The seeds are poisonous, but very few losses result from this source. The mature stems, leaves and pods contain but little poisonous matter.

Symptoms. See plains larkspur.

Treatment. See low larkspur.
Low Larkspur (*Delphinium menziesii* Nutt.): Always growing as simple individuals from a cluster of small tuber-like roots just as shown here. Flowers from pale to dark blue.
LOW LARKSPUR.

Considering Delphinium nelsonii and Delphinium menziesii to be identical species, then it is clear that, insofar as distribution is concerned, this type of larkspur should be mentioned. However, not much significance need be attached to it otherwise. The plants are comparatively small and do not, as a rule, grow in dense patches in this state. The roots of this larkspur consist of a cluster of tubers, as shown in the picture, and in this respect resembles the native aconites.

Where it grows. It is found at altitudes of from 4,000 to 10,000 feet on open hillsides and mountain parks. The plants seldom grow over one foot in height. The only area, that has come to the writer's attention, which is more or less covered with low larkspur, is found in the Medicine Bow National Forest.

When it appears. This is the first larkspur to appear in the spring. On account of its wide variation in altitude, the time of blossoming is greatly modified. In the foothills, the flowering plants may usually be found by June first; at higher altitudes (9,000 to 10,000 feet), the flowers may not appear until nearly a month later.

Animals affected. Cattle, mainly.

Poisonous period. Poisonous during the whole life of the plant.

Symptoms. Same as other species.

Treatment. Any treatment that is to be effective should be applied as promptly as possible. Animals poisoned by larkspur should be kept quiet, with head higher than rest of body. Bloating should be relieved by sticking. The use of a trocar is advisable for this purpose. The general practice of bleeding is often detrimental in larkspur poisoning. The hypodermic administration of the following substances is recommended by the U. S. D. A.:

Physostigmin salicylate.......................... 1 grain
Philocarpine hydrochloride........................ 2 grains
Strychnine sulfate.................................. ½ grain

This quantity dissolved in approximately 1 tablespoon of water would be the proper dose for an animal weighing 500 to 600 pounds. An animal weighing about double this weight would receive twice the quantity given in the formula. The syringe commonly used in blackleg vaccination will answer the purpose in most cases. The injection is usually made in the shoulder. The ingredients in this formula may usually be obtained from drug dealers.
Silvery Lupine (*Lupinus argenteus* Pursh.): Plants singly or in clumps, the branched stems erect or spreading. Flowers varying from blue to cream color or even purplish. Pods silvery-silky-hairy, as is the rest of the plant.
SILVERY LUPINE.

There are several different kinds of lupines in the state, but fortunately not all of them are poisonous, at least, not to the same extent. The silvery lupine is not only the most common but also the most poisonous. Therefore, a brief description of this plant will serve in a general way as an illustration of the other lupines.

Where it grows. It thrives best along streams and irrigation ditches where the soil is moistened to some extent by seepage water. This lupine rarely grows at an altitude above 8,000 feet. It requires a soil quite free from alkali and containing more humus than is required by many of the other poisonous plants.

When it appears. Under normal conditions, the silvery lupine appears early in June and is in partial bloom by the first of July. The fruit appears shortly afterwards, and from then on one may find flowers, green and mature pods, all on the same plant.

Animals affected. Affects sheep mainly. Other animals, horses, cattle, swine, and goats, may be poisoned if enough of the plant is eaten.

Poisonous period. Considered dangerous from the time the green pods appear until the plants dry up in the fall. Distinct toxic substances occur in the leaves and flowers, but apparently in too small a quantity to be effective. The seeds and pods retain their poisonous properties when dried, and occasionally losses result from the feeding of hay contaminated with lupine.

Symptoms. Animals may die shortly after the first symptoms appear or may live several days. A day may elapse between the eating of lupine and the appearance of symptoms, so that animals may trail a long distance from the seat of trouble before suspicion is aroused. With reference to symptoms exhibited by sheep, there may be frothing at the mouth, more or less trembling, nausea, and bloating. Symptoms especially characteristic are: excitement, leading to running about and butting into other animals and objects; convulsions, accompanying attacks of labored breathing.

Treatment. No satisfactory remedy is known that can be used advantageously for range animals. Most lupine poisoning may be avoided by keeping hungry animals away from lupine patches until their appetites are, at least, partially satisfied.
DEATH CAMAS* (Zyadenus intermedius Rydb.) : The illustration is distinctive, showing the characteristic bulbs, leaves, flowers, and seed capsules. The flowers are white but with a distinctively greenish cast.

*Note: Many other common names are in use but all are misleading. Since the plant is neither onion nor corn, to refer to the disease as "onion-poisoning" or "corn-poisoning" leads to confusion and should be avoided.
DEATH CAMAS.

The two principal species of death camas of Wyoming are *Zyadenus intermedius* and *Zyadenus elegans*. The *intermedius* is very widely distributed over the state. Most of the losses due to *Zyadenus* poisoning may be traced to this one species. While *Z. elegans* resembles the *intermedius* in general characteristics, yet its growth at the higher elevations in the mountains gives it a restricted zone, and consequently very little poisoning results. The summary that follows, therefore, pertains to *Z. intermedius*.

Where it grows. It appears to thrive on the sandy plains as well as in the drier and stonier foothills. Its most favorable location is in sandy swales where the soil remains moist for a comparatively long time. The plant is seldom found above an elevation of 8,000 feet.

When it appears. The grass-like leaves appear early in the spring, usually by the middle of May. These leaves are soon followed by the flower stalk which becomes six to ten inches high, terminating in a spike-like cluster of yellowish-green flowers. The flowering stage is generally reached by July first. As the season advances, the flower stalk lengthens out slightly into a nearly naked seed stalk bearing rather large capsules.

Animals affected. Sheep are more frequently poisoned than cattle and horses. This is probably not because sheep are more susceptible, but rather is due to the way in which sheep are managed upon the range. A band of sheep is usually herded, consequently the forage is apt to be grazed closely, and when passing over a death camas patch, a sufficient quantity of the plant may be eaten, by many of them, to produce poisoning.

Poisonous period. Dangerous throughout the life of the plant.

Symptoms. The characteristic symptoms of death camas poisoning as observed upon the range are: frothing at the mouth; nausea accompanied by vomiting; exhaustion accompanied sometimes with nervousness, the relaxation from which may cause an animal to lie for days in a stupor. It is not uncommon for a large number of sheep in one band to become affected.

Treatment. No effective remedial measures can be recommended. Like most other poisonous plants, trouble need not be feared if suitable feed is available.
Woody Aster (Xylorrhiza parryi Gray): The upper picture illustrates a clump of aster in bloom. The large daisy-like white flower heads are borne upon branches emanating from one root. The basal portion of the plant is shown in the lower photograph.
WOODY ASTER.

In years past, this plant has been the cause of greater sheep losses in Wyoming than any other single poisonous agency. At the present time, losses are being greatly reduced by careful practices in the handling of sheep. The plant never occupies an entire range, but is usually confined to small districts (from a few acres to several hundred), and it is therefore possible to avoid the more conspicuously infested areas.

Where it grows. Its growth is confined to an impervious, sticky clay more or less intermixed with gravel and containing appreciable quantities of alkali and other salts. Many of the slopes and ridges adjoining the Medicine Bow and North Platte Rivers afford ideal conditions for its growth.

When it appears. Usually the plant leaves out before May first. The flowers appear about the middle of June. Beginning about the first part of July, the plants become yellowish-brown in color and lose their attractive appearance.

Animals affected. So far as is known, sheep are the only animals poisoned by woody aster.

Poisonous period. Most of the losses occur during the earlier stages of the plant's growth. The plant, however, at no time fully loses its toxic activity and, therefore, is to be guarded against throughout its existence.

Symptoms. There appears to be a distinct variation in the nature of the poison corresponding to the plant's development. Poisoning from the immature and early flowering plants is characterized by: abdominal pain; bloating; serious disorganization of the internal organs, but no perceptible change in the color of the blood. The active principle in the older plants kills more quickly; alters the composition of the blood; but does not produce organic disturbances of sufficient magnitude to be readily observed in post mortem examinations.

Treatment. Due to a lack of experimental evidence, no specific treatment can be recommended. Laboratory tests indicate that a mild alkali should be effective, but its practical usefulness remains to be proven.
WATER HEMLOCK (Cicuta vulgaris Greene): This shows the typical rootstocks and the characteristic leaves, white flowers and small fruits. Suspected plants should be compared with the figures. (Reproduced by the courtesy of the U. S. Department of Agriculture.)
WATER HEMLOCK.

There are several plants, which belong to the parsnip family, occurring in the same places as the water hemlock (Cicuta). The non-botanist may, therefore, be confused in his identification unless considerable care is taken. The giant angelica might easily be taken for water hemlock, so far as appearance, odor and location are concerned. Fortunately, the poisonous properties of the Cicuta are confined to the underground portions (rootstocks) and therefore the aggregate losses are never alarmingly high.

Where it grows. Quite generally distributed over the state, principally along irrigation ditches and streams and in swampy meadows.

When it appears. Since the above ground portion (green or dry) appears to be harmless to stock, one is concerned mainly with the poisonous root stalk. Naturally, the seasonal variation of the foliage is of no particular interest here.

Animals affected. Poisonous to all classes of stock.

Poisonous period. Root stalk considered dangerous at any season of the year.

Symptoms. Acute abdominal pain; mental excitement, and finally violent convulsions.

Treatment. The poison is so active that usually time does not permit the administration of antidotes.
ARROW GRASS (*Triglochin maritima* L.): Readily distinguished from grasses by the long jointless stem and the fleshy sheathing rush-like basal leaves. Flowers in terminal spikes, inconspicuous and greenish. (Reproduced by the courtesy of the Nevada Experiment Station.)
ARROW-GRASS.

Recent experiments carried out by the Nevada Agriculture Experiment Station show that under certain conditions, arrow-grass may poison both sheep and cattle. Inasmuch as this plant occurs in practically all the alkaline bogs and marshes of Wyoming, a description of the plant is given so that its identity may be established and the necessary precautions followed.

Where it grows. Widely distributed over the state in wet, alkaline soils, and along the edges of bogs and sloughs. In some meadows the flowering stalks of arrow-grass may be entirely absent and the stool-like clusters of leaves be mistaken for wire grass. The flowers and seed-pods are sometimes confused with those of water plantain.

When it appears. Arrow-grass is one of the first plants to appear in the spring. The flowers usually appear about the first of July and the seeds about a month later. The plants remain green until late in the fall.

Animals affected. Poisonous to sheep and cattle.

Poisonous period. Poisonous in both the green and dried conditions.

Symptoms. Appear to be those of cyanide poisoning.

Treatment. The activity of the poison is such that the possibility of successful administration of an antidote seems to be rather remote.

The growth of arrow-grass being confined to bogs and to the low portions of meadows, excludes it quite generally from summer grazing. When hay is cut containing this plant, care should be taken to either eliminate it entirely or to feed it sparingly with other suitable forage.
WHITE Loco (Arachis albiilorus A. Tels.): This loco has a large semi-woody root from the crown of which spring the numerous leaves and white flower stalks. The purple loco (Arachis lamberti (Pursh.) Greene) is taller, slenderer and less tufted. (Reproduced by the courtesy of the U. S. Department of Agriculture.)
WHITE LOCO.

This is the plant commonly known in Wyoming as the "loco". It is widely distributed over the state, at elevations ranging from 4,000 to 10,000 feet. The loco plants in general have long semi-fleshy roots which enable them to withstand severe droughts. The extent to which animals in Wyoming, particularly horses, are injured by white loco is quite a difficult question to answer. Naturally, there is, from year to year, more or less loco poisoning; but, on the whole, it is not comparable with losses encountered in some of the neighboring states.

Another species of loco, Aragallus lamberti, is also common in Wyoming. It has a purplish blossom and in many respects closely resembles the white loco (Aragallus albiflorus). The poisonous properties of the two species are undoubtedly very similar.

Where it grows. It grows largely on knolls and ridges and often in great field-like patches on the plains. It thrives in sandy soils.

When it appears. The white loco, in common with some other species, remains green throughout the winter. The flowers usually appear by the first of June, although the season and elevation greatly modify the growth of the plant.

Animals affected. While horses, cattle and sheep are susceptible to the disease, the principal losses in Wyoming occur among horses.

Poisonous period. The loco appears to be a dangerous plant at any season of the year. The active principle, whatever it may be, is quite equally distributed throughout the whole plant.

Symptoms. In contrast to the action of most poisonous plants, the effects of loco progress slowly. Usually several weeks or months elapse before the disease is observed to be present. The important symptoms are: loss of flesh; irregularity of gait; weakness; and lack of muscular coordination. Symptoms exhibited by different classes of stock naturally vary within certain limits. For details relating to the loco disease, Farmers' Bulletin No. 1054 should be consulted.

Treatment. No antidote has been found which is uniformly successful. If practical, locoed animals should be removed from infested areas and given nutritious food.
Woolly Loco (Astragalus mollissimus Torr.): Stems short, but branching and bearing erect leaves and elongated stalks of purple flowers. (The above cut is not characteristic and in spite of the fact that it has appeared with this name in the bulletins of several states, may well represent some other species—A. N.). (Reproduced by the courtesy of the U. S. Department of Agriculture.)
Woolly or Purple Loco.

This species of loco comes into the extreme south-eastern section of Wyoming from the three states, Kansas, Colorado, and Nebraska, in all of which it is more or less common. On account of its limited distribution in this state, the woolly loco is not to be regarded as an important poisonous plant. However, a description of the plant is given largely because this species is known to be poisonous, and to be responsible for heavy stock losses in other states.

In comparing the pictures of the two locos (white and purple), one should be able to pick out the outstanding differences.

Where it grows. Grows more or less scattered on the plains, usually more conspicuous in the depressions than on the ridges. The soil requirements are not especially significant, since it may be found where there is a considerable variation in the quality of the soil.

When it appears. Usually appears during the last of April and blooms about the first of June.

Animals affected. Feeding experiments show that while all classes of stock are susceptible, the losses from this source are limited almost exclusively to horses.

Poisonous period. There appears to be no marked seasonal variation.

Symptoms. See white loco.

Treatment. See white loco.
TWO-GROOVED MILK VETCH (*Astragalus bisulcatus* (Hook.) Gray): This legume forms large clumps and is readily distinguished by the violet flowers and by the pods which, on the lower side, have a marked ridge with a sharp groove on either side of the ridge.
TWO-GROOVED MILK VETCH.

Ordinarily, this plant is not to be considered particularly dangerous. On account of its coarse appearance and offensive odor, most animals instinctively avoid it. A description of the plant is given because we know that, under certain conditions, it may produce poisoning. Corral feeding, using sheep and cattle, has not aided us materially in explaining certain cases of range poisoning. Therefore, as long as suspicion is held concerning this vetch, it is advisable to know something of its nature.

Where it grows. Quite generally scattered over the state. Grows in dense clumps and attains a height of from 2 to 3 feet. It grows mostly on the moist sides of ravines and gentle slopes.

When it appears. Usually appears during the month of May and goes to seed the latter part of July.

Animals affected. Poisonous to sheep and cattle, but we have no evidence as to its effect upon horses.

Poisonous period. Probably poisonous throughout its whole life. Poison is found in all parts of the plant.

Symptoms. When eaten by sheep and cattle in moderate quantities for a long period, symptoms develop which correspond in every way to those of loco poisoning.

Suspicion is held as to the effect produced when fatigued animals are permitted to eat excessive amounts of vetch at one feeding. A few cases of range poisoning point to the fact that it may produce death under these conditions in a comparatively short time.

Treatment. No definite suggestions.
Milkweed (*Asclepias speciosa* Torr.): This is the most beautiful and conspicuous milkweed in the state. Its large broad leaves and handsome purplish flowers are characteristic. (Reproduced by the courtesy of the Nevada Experiment Station.)
MILKWEED.

The broad-leaved or showy milk-weed is another one of the lesser poisonous plants of Wyoming. When the natural forage of a range becomes depleted, it occasionally happens that animals are forced to eat this plant, although it is disliked by them.

Recently the Nevada Experiment Station has conducted some milkweed feeding experiments with sheep. The parts of the plant used were: green leaves, leaves as they dried up naturally in the field, seeds, and the pods.

Where it grows. Fairly widely distributed over the state. Usually found on a soil somewhat richer than the average type of range soil.

When it appears. Usually appears in June and remains green until late summer.

Animals affected. Poisonous to sheep. Its effect upon cattle and horses is not definitely known.

Poisonous period. The Nevada investigators found in their experimental feeding work that (1) the green leaves are poisonous, (2) relatively large amounts are required to cause poisonous symptoms in a mature range ewe, (3) the pods alone are poisonous, (4) the seeds are highly poisonous, and (5) the plant dried naturally in the field contains but little of its original poisonous matter.

Symptoms. The symptoms observed in the above mentioned feeding tests and probably characteristic of this form of poisoning were: extreme dullness; total loss of appetite; and a tendency to lie down. In severe cases, the breathing was distinctly irregular, the breath being expelled forcibly.

Treatment. No suggestions other than prevention.
SLENDER PSORALEA (Psoralea tenuiflora Pursh.): A bushy plant with hard wiry slender branches, and small purplish-blue pea-blossoms. Pods very small and glandular-warty. (Reproduced by the courtesy of the U. S. Department of Agriculture.)
SLENDER PSORALEA.

The fact should be borne in mind that there are a number of poisonous plants in Wyoming which are perhaps just as deadly as the larkspurs, species of camas, etc., but are ordinarily regarded as unimportant for the reason that animals do not eat them, at least, only rarely. Definite information concerning the effects of many of these plants upon domestic animals is either meager or lacking entirely. *Psoralea tenuiflora* is a poisonous plant, beyond any question of doubt, but on account of its bitterness, is seldom molested. (*Psoralea* is pronounced sor-a-le'-'a.)

**Where it grows.** On the plains of the eastern part of the state.

**When it appears.** Usually appears in May and dries up in September.

**Animals affected.** Said to be poisonous to cattle and horses.

**Poisonous period.** Not definitely known.

**Symptoms.** Experimental evidence lacking.

**Treatment.** Inasmuch as the plant is rarely eaten, it follows that unless the pasturage is poor or the plant is fed in large quantities, very little trouble may be expected from this source.
Aconite (Aconitum columbianum Nutt.): The careless observer might readily pass this for a larkspur, but attention to the blue blossom shows instead of the "spur" a rounded "hood"; hence the common name "monkshood" is sometimes used. (Reproduced by the courtesy of the U. S. Department of Agriculture.)
ACONITE.

While the aconites are poisonous plants, it is pretty definitely settled that they do not poison range stock. Mention is made of the aconite (*A. columbianum*) because it not only grows in close proximity to the tall larkspur, but may be confused with it.

**Where it grows.** This species of aconite grows at elevations ranging from 5,000 to 10,000 feet, along brooks and springs and in low ground. Outside of Yellowstone Park, the aconite occurs only in scattered districts.

**When it appears.** The aconite and tall larkspur have about the same seasonal growth.

**Animals affected.** It has been demonstrated that cattle are not susceptible. Sheep and horses may be fatally poisoned by aconite.

**Poisonous period.** Poison is said to be largely in the seeds and roots so that there is greater danger to grazing animals during the seeding stage.

**Symptoms.** Closely resemble those produced by the larkspur.

**Treatment.** No specific antidote is known.