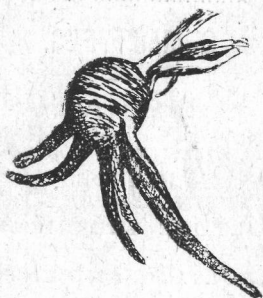


OREGON AGRICULTURAL

# Experiment Station.

BULLETIN NO. 46---JUNE, 1897.



A Plant that Poisons Cattle.

## CICUTA

(*Cicuta vagans* Green.)

By U. P. HEDRICK.

The Bulletins of this Station are sent free to all residents of Oregon who request them.

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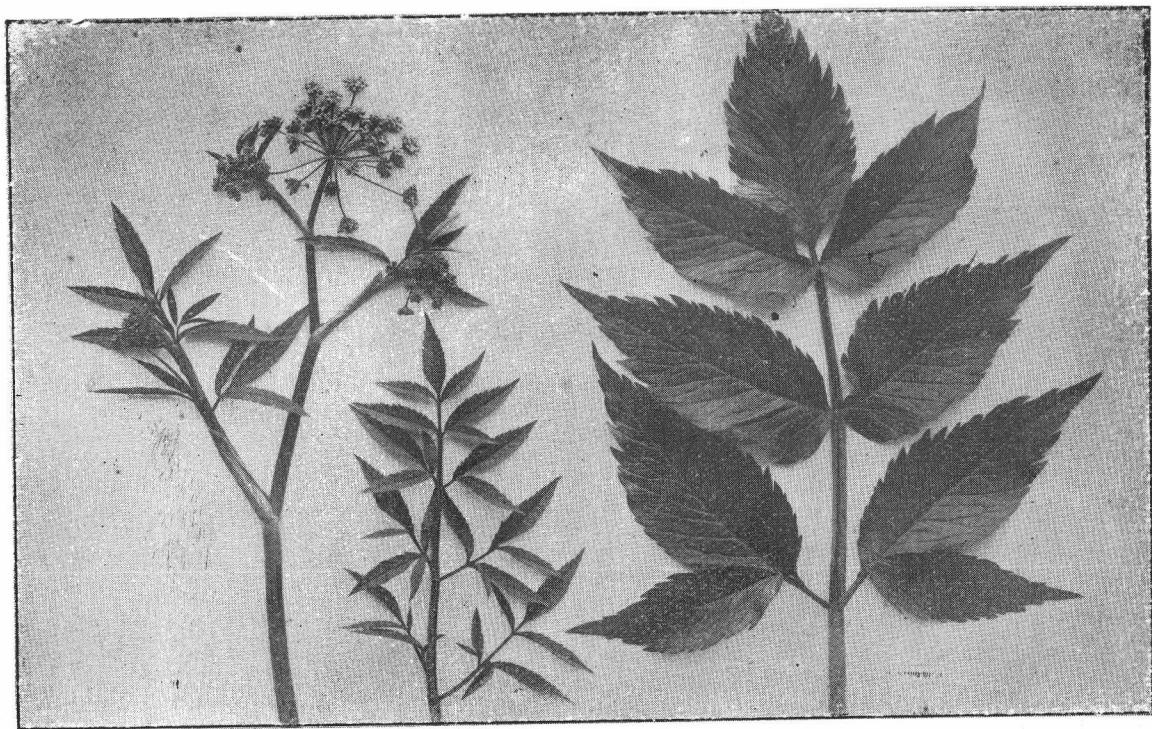



PLATE I. LEAVES AND FLOWERS OF CICUTA. *Cicuta vagans* Greene.

## A PLANT THAT POISONS CATTLE.

### Introduction.

 PLANT growing in the low pasture lands of Oregon, poisons cattle in the late winter and early spring. Last spring probably not less than one hundred cattle were poisoned in those parts of the state where this plant grows. The inquiries as to what this plant is, has been a common and urgent one made of the Station men at the Oregon Experiment Station. Several attempts have been made to answer it. Such investigations may be briefly noted as follows:

In the summer of 1889, Professor P. H. Irish, then in charge of the Department of Chemistry of this Station, fed the following plants to stock:\* Common Larkspur (*Delphinium exaltatum* Ait.), Camass (*Camassia esculenta* Lindl.), Sanicle (*Sanicula howellii* C. & R.), degenerated cultivated Parsnip (*Pastinica sativa*, L.) and Cow Parsnip (*Heracleum lanatum* Michx.); all had been reported as having poisoned cattle, but as fed by Professor Irish proved harmless.

In the spring of 1896 a farmer in Linn county sent to the Station a quantity of roots of Larkspur, saying that he felt sure that cattle of his had died from eating them. A cow at the Station was made to eat the roots sent and no ill effects followed, again proving the harmless nature of the roots of Larkspur.

The following letter, recieved January 6, 1897, from Waldport, Lincoln County, Oregon, is published as being typical of letters received every spring, and as indicating the time that reports of cattle poisoning begin to come in.

"I send by to-day's mail a root that is playing havoc among the cattle in this section of the state. A number of cattle have died in this vicinity from eating it, several having died on my ranch. What will counteract the poison that the plant contains?

Yours respectfully,

W. H. Harrison.

The roots proved to be those of *Cicuta vagans* Greene,—a

\*Bul. No. 3, p. 25, Ore Expt. Sta.



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plant of the Parsnip (*Umbelliferae*) family. Upon request, Mr. Harrison sent a quantity of the roots to the Station. A few of these were fed experimentally to two cows, and, though but a small quantity of the roots was taken into the stomachs of the animals in both cases, death resulted within two hours. The behavior of these animals under the influence of the poison and the remedies tried, will be described in another part of the bulletin.

Following the above experiment, several plants belonging to the Parsnip family, closely related to *Cicuta*, and generally found growing with it, and often suspected as being poisonous, were fed and proved to be harmless. This, and a more thorough investigation of the properties of *Cicuta*, seem to indicate, conclusively, that the latter is the plant that poisons cattle.

Before attempting a further discussion of the plant in question, it may be said that its description for popular identification, is attended with many difficulties; for it belongs to a family, many of whose members are so nearly alike in appearance and habits that a skilled botanist can identify some species only by minute differences in plant structure. I must, therefore, in my description, enter into details that might seem unnecessary to one not apprised of the difficulties to overcome. But, by the aid of the plates, made from photographs, and the descriptions of plants that might be mistaken for *Cicuta*, the average reader should have but little difficulty in identifying the plant in question.

#### **Name.**

The name, *Cicuta vagans* Greene, was given by Professor Edwin L. Greene, now of the Catholic University, Washington, D. C., in 1889.\* Previously, it had been considered as identical with *Cicuta maculata* Linn, the Eastern species of this genus. In all text-books, applicable to the Pacific Coast, the plant is yet called *C. maculata*, but botanists have adopted the name given by Greene.

In the matter of common names there is much confusion regarding this, as of many plants in the Parsnip family. The *Cicutas* are known in the various localities in which they are found by a number of common names. Gray, our best authority, alone, gives five popular names to the common *Cicuta*, as

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\**Pittonia*, Vol II, Part 7, Dec. 1889.

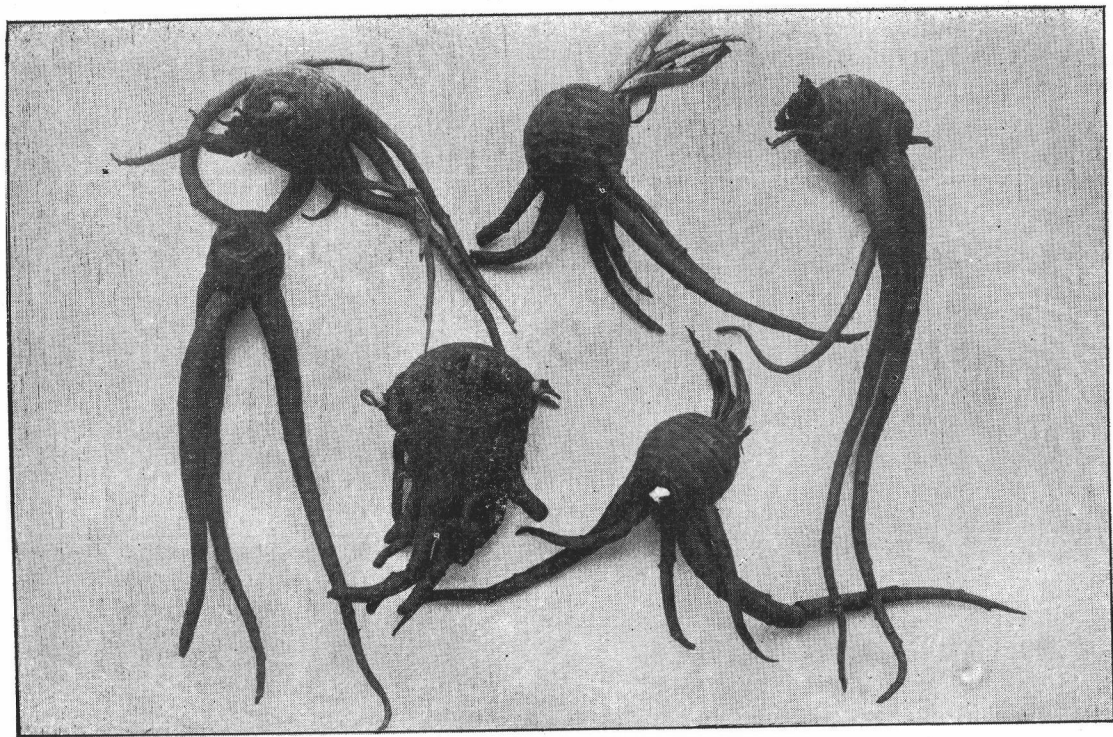


PLATE II. BULBS OR ROOT-STALKS OF CICUTA. *Cicuta vagans* Greene.

follows: Water Hemlock, Musquash Root, Spotted Cowbane, Beaver Poison and Muskrat Weed. Other botanists add to these, Wild Parsnip, Water Parsnip, Cowbane, and Snake Root. All these show how inaccurate and unsatisfactory are common names. If any one of these popular names is to be used, Water Hemlock is most applicable, but there cannot be any reasonable objection to calling the plant *Cicuta*, a name, about which, there could be no confusion.

### Description.

The *Cicuta* found in Oregon, is a tall, smooth, coarse growing plant; its stems are round and hollow, branch from the base, may be erect or reclining in growth, and reach a height of from 3 to 6 feet; the stems spring from a bulb-like, perennial root and after flowering in mid-summer soon die down; the leaves are from 2 to 3 feet long, smooth and glaucous, sometimes with a purplish cast, two or three times divided (bi or tri-pinnate); the leaflets are borne on the upper third of the leaf, there being, generally from 4 to 6 pairs, they are oblong and lance-shaped, about 2 inches in length,  $\frac{3}{4}$  of an inch wide, coarsely toothed, sometimes unequally divided or lobed, and with small veins running from the midrib to the notches in the edge of the leaflet. A part of an old and of a young leaf are shown in Plate I.

The plant blooms in midsummer and bears an umbel or umbrella shaped cluster of small, white flowers at the end of a long stalk or peduncle (Plate I); from the blossoms, broadly ovate, kidney-shaped, ribbed fruits about  $\frac{1}{8}$  of an inch long are formed; these, when cut crosswise, show minute tubes containing an aromatic oil much like that in the seeds of the common Parsnip; the seeds in these fruits are small, nearly cylindrical in shape, and have a slightly hollowed face.

In studying the plant it will be found that the *root bulb is the most distinctive part and will aid most in identification*. Special attention is called to Plate II in which the bulbs are well illustrated. A comparison of this plate with the other plates shows very strikingly the difference between the underground parts of plants of the Parsnip family, and makes obvious the great value of the roots as a means of identifying *Cicuta*. Taking the bulbous roots alone, as a means of identification, one could hardly make a mistake in naming *Cicuta*. The subterranean

part of *Cicuta*, properly speaking, is a close jointed, underground stem. It is bulb like in appearance, 2 to 4 inches long and 1 to 2 inches thick. In color the exterior is a dark purplish green, the interior a yellowish white, the flesh firm and bearing an abundance of reddish, aromatic oil—the odor of Parsnip being most decided; the root bulb is only partly underground and emits long fibrous roots from beneath. The poisonous property of the plant, cicutoxine, is found in the oil of the bulb.

#### Habits.

The flowering and fruiting part of *Cicuta* is sustained by food stored away during one or more years of immature existence. The reservoir for this supply is the bulb-like underground stem. After flowering, plant and root die, but while the flower is developing, the crown of the root, or underground stem, sends out one or more large buds, which, before the flowering stalk is dead, have formed roots of their own and are ready to produce a new plant. These buds sometimes require one, and sometimes two seasons for full growth. From the above it will be seen that the life limit of the species is intermediate between that of a biennial and a perennial.

In growth, as the plant reaches maturity, it becomes stout and scraggly, very often covering an area of five or six feet. Before reaching the fruiting season, the underground stem and roots become exhausted and begin to decay, the plant at this time being sustained and supported by tough, fibrous roots springing from a point where the leaves break from the underground stem. These roots are called accessory roots. At this period the young offsets are being formed.

#### Distribution.

*Cicuta* is found, in Oregon, in marshy or wet places both on the seashore and in the mountains. It is of most frequent occurrence along the banks of coast rivers and inlets, but is reported as being quite common about the lakes of Southern and South-Eastern Oregon. It is so plentiful throughout all of Western Oregon, that it is dangerous to cattle, during the spring, in uncultivated, marshy, pasture land. *Cicuta* is also found in abundance in Northern California, in Washington, and in British Columbia.

Other semi-aquatic plants of the Parsnip family, are often



found growing with the *Cicuta*, which adds to the difficulty of recognizing it and gives the others, most of which are harmless, a bad reputation. It is safe to say that no other plant in this family need be feared in Oregon pastures at the time when *Cicuta* is dangerous, viz. from January to May.

### **Damage Done by *Cicuta*.**

It is hard to estimate the number of cattle killed yearly in Oregon by eating *Cicuta*. One hundred would be a low estimate in my judgment. Animals eat the underground portion of *Cicuta* in getting the tops which form about the first green herbage in early spring; as they browse the foliage, the roots, being only partly subterranean, and growing in a soft soil, are pulled up and eaten. A piece the size of a walnut, it was found by experiment, is sufficient to kill a cow. It is probable that the poisonous constituent is found only in the underground stem and the roots.

While the victims of the plant are chiefly cattle, yet they are not exclusively so. The poisonous parts are often mistaken for Parsnips, Artichokes and Horse-radish, and thus human victims are not infrequent. A number of cases of poisoning from *Cicuta* are annually reported in the United States. A writer in a local paper a few months ago, reported the case of two cattlemen in Southern Oregon, who, after eating "Wild Parsnip," presumably *Cicuta*, died in a few hours. Falk reports, that in Europe, in thirty-one cases of poisoning from *Cicuta*, 45 per cent died.

### **Symptoms of Poisoning, and Remedies.**

Soon after receiving a quantity of the *Cicuta* bulbs from Mr. Harrison of Waldport, as before mentioned, it was decided to try their effects upon a cow, in order that a more direct knowledge of the action of the poison might be obtained. The following is the description of the behavior of two animals to which was fed the *Cicuta*,—the notes having been taken by Professor H. T. French, the Station Agriculturist.

"A bulb was cut into small pieces, mixed with a carrot cut up in the same way, and fed to a two-year old grade heifer. The material was fed at 8 o'clock, a. m., and at 9:30 the animal was dead. The poison performed its work so quickly, that we were unable to be present at the moment death occurred. The animal

evidently died in a spasm, froth and foam having escaped from its mouth in considerable quantities.

"On post-mortem examination, pieces of the root were found in the rumen, and in the reticulum or second stomach. None was found beyond the second stomach. It was somewhat surprising to find not more than two drams of the root in the stomach. A very small portion might have passed beyond recognition by mastication, but a careful examination was made resulting in the finding of the above amount. From the amount left in the feed-box it was evident that only a very small portion had been eaten.

"The lungs were highly congested, otherwise there were no abnormal conditions noticed in the abdominal or thoracic cavities.

"The following day another animal was fed the poisonous roots in order that an attempt might be made to counteract the effect of the poison with an antidote.

"A calf one year old was selected for the experiment. The temperature of the animal was taken in the evening and morning preceding the experiment. The normal was found to be  $102\frac{1}{2}$  degrees.

"Two bulbs the size of an egg were cut and mixed with carrots, and a little grain sprinkled over the roots. The material was eaten under protest in order to get the grain and carrots.

"The roots were fed at 9:15, a. m.; at 9:40 the temperature was 103, and the muscles about the nose began to twitch. At 10 o'clock the temperature had risen to  $103\frac{1}{2}$ , and the animal was a little uneasy. At 10:25 the temperature was 104, and there was a trembling about the flanks. The eyes watered very freely; at 10:35 the animal was somewhat excited, and the temperature was  $104\frac{1}{4}$ . At this time urination began and continued very freely until death ensued. At 10:45 the animal fell over on its side in a spasm. The eyes were drawn and the muscles were rigid and contracted violently. The animal fell backward rather than sideways, and when part way down rolled on its side.

"As soon as possible it was given an ounce of spirits of turpentine in a quart of milk, and immediately the calf recovered its feet and began to walk about, though with difficulty; its limbs were stiff and it walked with a straddling gait. At

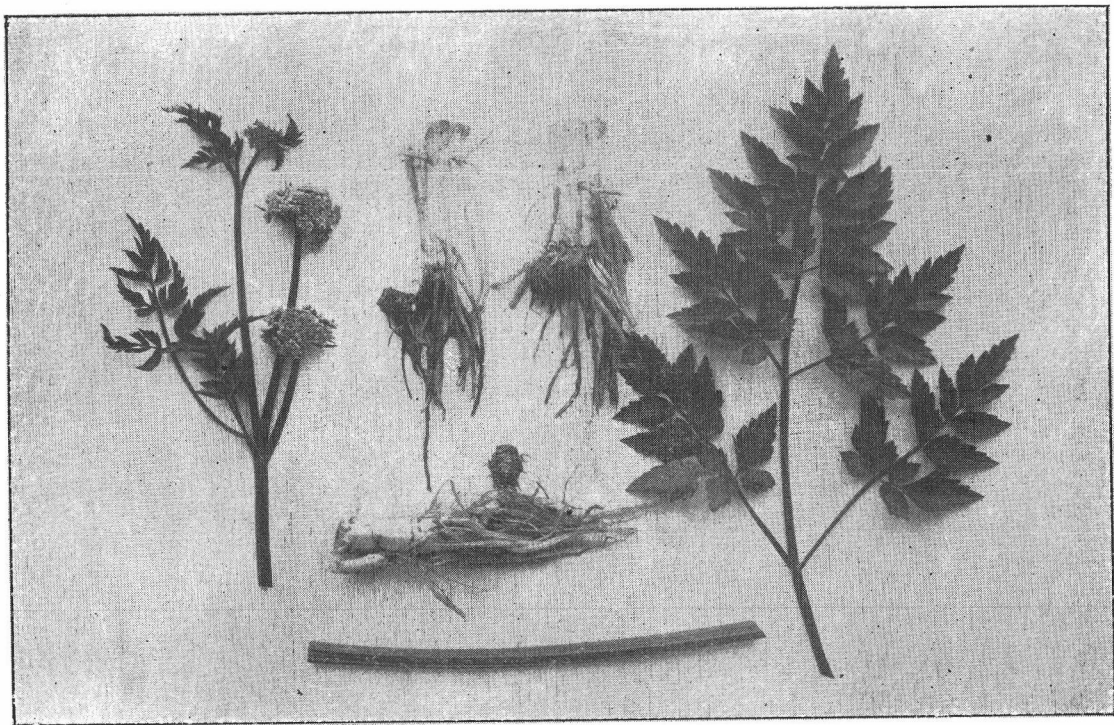


PLATE III. WILD CELERY. *Oenanthe sermientosa* Nutt.

10:55 the temperature stood at  $104\frac{1}{4}$  and perspiration was flowing very freely. The respirations were hurried being about double the usual number per minute; soon there were indications of severe spasms. The dose of turpentine and milk was repeated and the animal stood up till 11:30, when it went down as before. A full dose of tincture of aconite with a quart of milk was given, but no results were noticed; immediately after a hypodermic injection of nitro-glycerin was made, but with no results. The spasms were almost continuous from the time the animal fell over until death took place at 11:45, just two and one-half hours from the time the poison was administered. The highest temperature reached was  $106\frac{1}{4}$  degrees."

The cattle were fed, as above described, in March. During the next few weeks a number of "sure" remedies were recommended. The most common of these are lard, bacon grease, milk, and flour. The milk had proved to be worthless in the first experiments, but to satisfy ourselves regarding the other named remedies, and to try some of a more medicinal nature, another animal, early in May, was fed several of the poisonous bulbs. The bulbs were of the same lot used in the first experiments, but had been growing for a month in a green house. It was expected that growth would remove some of the dangerous properties of the bulbs, but it was a surprise to find that an animal eating many times as much of them as had killed the cows in the previous experiment suffered no ill effects whatever. The conclusion is obvious; the bulbs are only dangerously poison when in the dormant state, or for a short time after growth begins in the spring. Cattle are likely, then, to be poisoned only from the first of January to the middle of May.

It is probable that the simple remedies, as lard, bacon grease, flour, and milk, so highly recommended by stockmen, in the milder cases, are of value, as they are substances which would tend to retard the absorption of the poison in the stomach, and, given in sufficient quantities, would act as a purgative to expel it from the intestines. But it is my opinion that none of these would be of avail with an animal that had swallowed even a small quantity, a few drams, of the bulb when the poison is most virulent. Further investigation may develop some agent more potent as a remedy but until then, farmers must depend upon



prevention—keeping their cattle from pasture lands containing Cicuta.

### Eradication.

An effort should be made to eradicate Cicuta completely from all enclosed pastures. Cultivation will soon exterminate it from fields that can be tilled. In other pasture lands, the plant once recognized, can be eradicated during spring and summer by going over the field with a sharp hoe, spade, or shovel, and chopping out the roots, a thing easily done; or, better still, while the ground is soft in the early spring, just after the plants begin to grow, they may be pulled out by hand thus securing complete extirpation. In most pastures Cicuta occurs but sparingly and to detect it will require close observation. The bulbs can be readily destroyed by exposing them to the direct action of the elements—sun, frost, and wind, so that an occasional plowing is effective in getting rid of the plant.

### Related Plants Likely to be Mistaken for Cicuta.

Two plants closely related to Cicuta are often mistaken for it, and, since both are more plentiful than the Cicuta, cause those upon whose premises they grow, much uneasiness. A careful comparison of the description of the plants here given aided by the plates, will enable farmers to easily distinguish these more common and harmless plants from the Cicuta. The first of these plants is:—

**WILD CELERY.** (*Oenanthe sarmentosa* Nutt.)—Wild Celery is well shown in Plate III. A comparison of the parts of the plant in the plate with those of Cicuta on Plates I and II, shows that the leaves and leaflets are much smaller, the stems weaker and *ridged*, that there are bracts or leaflets, called involucre, under the flowers; and that the root stocks or bulbs, are very much different, in being smaller, less closely attached to the plant, and of a different shape. The plant is more aquatic in habit than the Cicuta; growing nearly always in water, often in running water. Wild Celery is smaller than the Cicuta, growing only from 2 to 3 feet high. Its thick, aromatic roots have the smell of Celery, instead of the Parsnip as has Cicuta, and the base of the leaf stems much resemble those of small Celery stems. The plant is edible and is much relished by the Indians, and is not unacceptable to a hungry White Man.

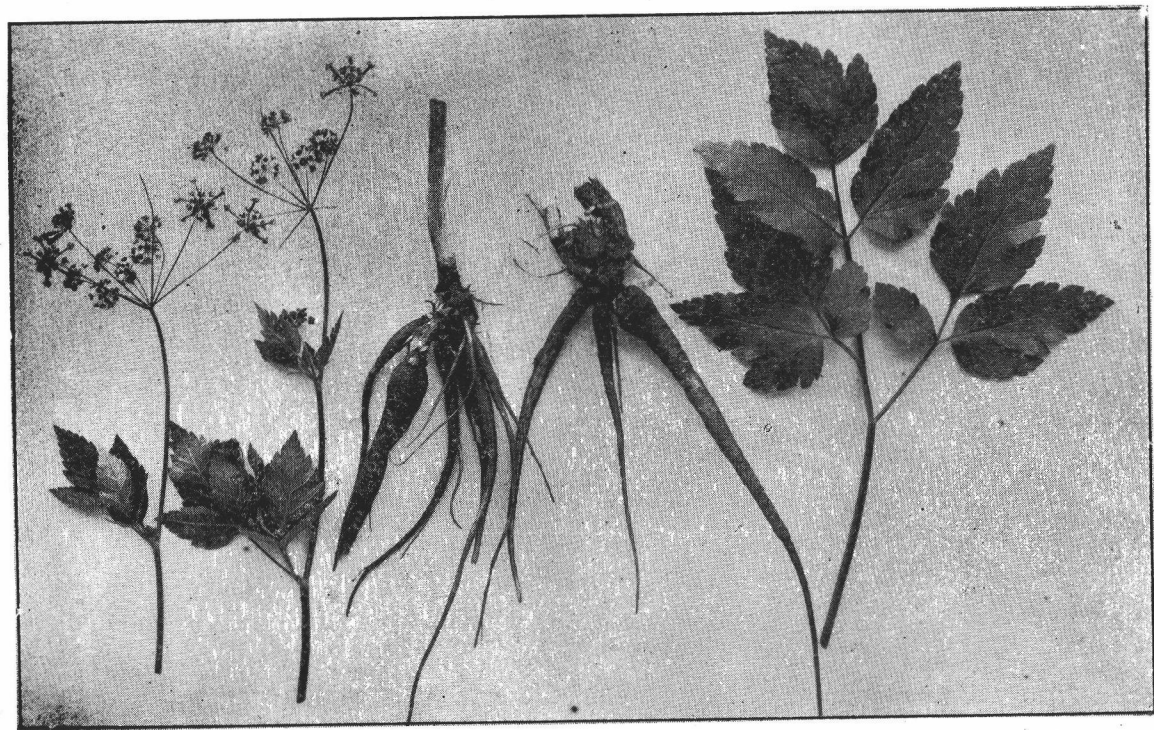


PLATE IV. SWEET CICELY. *Glycosma ambiguum* Gray.

**SWEET CICELY.** (*Glycosma ambiguum* Gray.)—Sweet Cicely, the second plant that farmers commonly mistake for Cicuta, is shown in Plate IV, and a comparison of this plate with the preceding ones will make plain the differences. It may be easily distinguished from Cicuta by the root, its smaller size, its smell of Cicely or Anise instead of Parsnip, and the fact that it is common in dry lands as well as in marsh lands. Sweet Cicely is harmless.

There are other plants which as closely resemble the Cicuta as the two described above, but they are not common in pastures and are not to my knowledge suspected of being poisonous. Wild Celery and Sweet Cicely have been frequently brought to the Station as "the plants that poison cattle."

**POISON HEMLOCK.** (*Conium maculatum* Linn) has been sparingly introduced in waste places in the neighborhood of the older settlements, but it is not dangerous in pastures as its herbage comes at a time when good pasturage is plentiful and, moreover, its leaves exhale a sickly, disagreeable odor which repels all animals. Its smaller size, white fusiform root, foliage spotted with purple, and later appearance, easily distinguish it from Cicuta.

## REVIEW.

1. Cicuta, a plant of the Parsnip family, growing in the low, pasture lands of Oregon, in late winter and early spring, poisons cattle.
2. The following plants, reported poisonous, were fed to cattle without ill effects: Larkspur, Camass, Sanicle, degenerated cultivated Parsnip, and Cow Parsnip.
3. Common names are inaccurate, and the plant in question should be called Cicuta, to avoid confusion. Locally, Cicuta is often known as, Wild Parsnip, Water Hemlock, Musquash Root, Cow Bane, Water Parsnip, Muskrat Weed, and Snake Root.
4. Cicuta is a tall, smooth, coarse, marsh perennial; the stems come from a bulb-like, underground stem; the leaves are from 2 to 3 feet long and have from 4 to 6 pairs of lance-shaped, coarsely-toothed leaflets; the plant blooms in midsummer and bears an umbel of white flowers which form small kidney-shaped,

ribbed, aromatic fruits. *The underground root-stock is the most distinctive part of the plant and will aid most in identification.*

5. *Cicuta* is found throughout Oregon, Washington, Northern California, and British Columbia. It is of most frequent occurrence along banks of coast, rivers and inlets.

6. It is estimated that about 100 cattle are killed annually in Oregon by eating *Cicuta*. Human victims of *Cicuta* are not infrequent in the United States.

7. After eating the *Cicuta* roots death takes place, commonly, in a few hours. The symptoms of poisoning are uneasiness, twitching about nose and mouth, trembling of the flanks, watery eyes, much perspiration, high temperature, continued urination, and finally violent spasms which end in death.

8. As a remedy, stockmen recommend, lard, bacon grease, milk, and flour; these, by absorbing the poison, and acting as a purgative may be of avail in mild cases.

9. *Cicuta* should be eradicated from enclosed pastures by cultivation, cutting out, or pulling up.

10. Two common plants of the same family, Wild Celery and Sweet Cicely, are often mistaken for *Cicuta*.