

236.3
L10AR
1897

First Annual Report

OF THE

Board • of • Sheep • Commissioners

OF

MONTANA.

T. G. POWER, PRESIDENT.

CORNELIUS HEDGES, SECRETARY.

HELENA. MONTANA.

1897.

STATE PUBLISHING CO.

STATE PRINTERS  AND BINDERS.

HELENA, MONTANA.

Montana State Library



3 0864 1006 5233 1

First Annual Report

OF THE

Board of Sheep Commissioners

OF

MONTANA.

T. C. POWER, PRESIDENT.

CORNELIUS HEDGES, SECRETARY.

HELENA. MONTANA.

1897.

STATE PUBLISHING CO.

STATE PRINTERS  AND BINDERS.

HELENA, MONTANA.



Digitized by the Internet Archive
in 2013

ANNUAL REPORT
OF THE
State Board of Sheep Commissioners.
1897.

Helena, Montana, November 30, 1897.

To His Excellency, Honorable Robert B. Smith,

Governor of the State of Montana:

Dear Sir:—In accordance with the provisions of Section 6 of an "Act to provide for the appointment of a Board of Sheep Commissioners and to define their powers and duties," the following report is submitted:

The act creating this Commission was only approved March 5th of the present year and the first meeting of the Commissioners thereunder was held March 22nd following, at which date the organization was perfected by the adoption of Rules and Order of Business and the election of Hon. T. C. Power as President and Mr. B. Brown, Secretary. At that meeting commissioners were present from fourteen counties.

A subsequent meeting of the Board was held October 12th, 1897, at which seven commissioners were present, (five being necessary to constitute a quorum.) Secretary Brown having removed from the state, Cornelius Hedges was chosen Secretary, and entered upon the duties of his office November 1st.

In nineteen counties of the state commissioners have been appointed, qualified, and entered upon the duties of their office, as follows:

COMMISSIONERS.

Beaverhead—T. M. Selway, Dillon.
Broadwater—P. B. Clark, Toston.
Carbon—David Smethurst, Red Lodge.
Cascade—F. D. Cooper, Cascade.
Choteau—Geo. B. Bourne, Whitlash.

Custer—R. R. Selway, Stacy.
 Dawson—William Lindsay, Glendive.
 Deer Lodge—William Williams, Deer Lodge.
 Fergus—David Hilger, Lewistown.
 Flathead—.....
 Gallatin—John F. Work, Bozeman.
 Granite—.....
 Jefferson—.....
 Lewis and Clarke—T. C. Power, Helena.
 Madison—S. R. Buford, Virginia City.
 Meagher—D. E. Folsom, White Sulphur Springs.
 Missoula—D. R. Maclay, Lo Lo.
 Park—.....
 Ravalli—.....
 Silver Bow—T. C. Miles, Silver Bow.
 Sweet Grass—W. P. Franklin, Melville.
 Teton—G. I. Smith, Choteau.
 Valley—W. B. Shaw, Poplar.
 Yellowstone—I. D. O'Donnell, Billings.

In the remaining five counties there are but few sheep and either no commissioners have been appointed or those appointed have failed to qualify. The statistics from those counties have been gained by correspondence or personal visitation by agents of the Board.

In the following counties Deputy Inspectors have been appointed:

DEPUTY SHEEP INSPECTORS.

Beaverhead—Frank Landon, Dillon.
 Carbon—Frank L. Clark, Red Lodge.
 Cascade—H. H. Nelson, Cascade.
 Choteau—John F. Patterson, Fort Benton.
 Custer—Charles Daly, Miles City.
 Dawson—Henry Hodgson, Newlon.
 Deer Lodge—C. H. Williams, Garrison.
 Fergus—David Hilger, Lewistown.
 Madison—L. S. Briggs, Ennis.
 Meagher—C. W. Cook, Unity.
 Sweet Grass—Samuel Jackson, Big Timber.
 Teton—Walter S. Clark, Choteau.
 Valley—Jas. C. Gregory, Culbertson.
 Yellowstone—J. T. Boyer, Billings.

The only salary paid is that of the Secretary, fifty dollars per month, and for office rent, including accommodations for annual meetings, one hundred dollars per annum.

Though so recently organized and working at great disadvantage the Board of Sheep Commissioners is able to make such a showing as to

demonstrate the wisdom of the new law, which for the first time gives this great and growing industry of our young state an organization to unite, protect, and foster its interests, and some source of revenue to promote its special interests. Indeed, the growth of the sheep and wool industry in Montana is something phenomenal.

The census of 1870 credits Montana with possessing 2,040 sheep. These were brought in by Poindexter and Orr of Dillon, for butchering. The first stock sheep, about the same number, were brought in by Davenport and Ray of Helena, in November, 1871.

The showing for 1896, as given in Appleton's Annual Encyclopedia, makes the number very nearly 3,000,000, though during that time the industry suffered one severe set-back in the severe winter of 1886-7, before shelter and feeding were thought necessary, when large numbers perished.

Again, the action of Congress in placing wool on the free list had a depressing influence upon the industry for four years, anticipating and following the enactment of the Wilson-Gorman law. While under this latter depressing influence the number of sheep in the country fell away nearly or quite ten millions. In Montana the numbers continued slightly to increase, showing, under the circumstances, greater vitality than in any other state or territory, and according to the authority previously quoted, placing Montana at the head of the list in the number of sheep and pounds of wool produced.

Twenty-five years' experience and the present condition and prospects of the industry show two things conclusively, that our climate, soil, and natural pasturage are admirably adapted to the healthy growth of sheep whether produced for wool or meat, and that it is destined by natural conditions to continue indefinitely to be one of the leading industries of our state. None too soon have those engaged in the industry shown a disposition to unite their efforts under the sanction and shelter of law to protect and develop their interests. Sheep-owners certainly have as many common interests as those engaged in any other line of investment and industry in the world. Their industry is neither new nor ephemeral. It dates back to the earliest appearance of man in recorded history, when Abel from the firstlings of his flock offered the most acceptable sacrifice to Deity. The pages of sacred and profane history, when not crimsoned with the bloodshed of war, are white with the fleecy products of the flocks. The lamb has ever by common consent been regarded as the emblem of innocence, purity, and peace. Not without reason, full of fathomless significance, was the Saviour of mankind hailed as the Lamb of God.

There is every reason to believe that the tradition of the early Greeks, of Jason and his argonauts in search of the "golden fleece" to the shores of the Black Sea, was to introduce sheep into Greece. Our word "pecuniary," derived from the Latin word which signifies "flock,"

points to the time when the wealth of the world was counted in flocks and herds and not in coin of silver and gold.

It is still true as ever that with all the transmigrations and changes of our races in their evolution through civilization and enlightenment, the sheep is the most serviceable and essential of all the animal kingdom to the support and comfort of mankind. The sheep thrives best where man develops and thrives best, in the temperate zone. Some may sing the praises of the horse, the ox, the camel, or reindeer, but more useful and needful and of wider range of utility than any of these is the sheep. There is no waste about a sheep. Every part and particle is of value. Even to Montana, with all her wealth of precious and useful metals and minerals, with the best soil and climate for wheat and other small grains in the world, limited only by the feasibility of irrigation, there is no source of permanent wealth so full of promise as sheep-raising.

Fortunate, indeed, is Montana that in addition to her treasures of gold, silver, copper, iron, and coal, she possesses a soil and climate suited for growing of wheat, barley, oats, etc., but more fortunate still in having a climate, soil, and natural herbage so permanently adapted to the raising of sheep, cattle, and horses, the best of all live stock. Let neither be jealous or envious of the other. It is a trinity of endowments that should lift our people above the envy of any other portion of our common country, and providentially opens the field and points the way to the exercise of all our skill and energies.

STATISTICS.

One of the objects sought in organized effort is the collection of accurate statistics. We should know "where we are at" before we can make an intelligent move in any direction. A glance at such statistics as are accessible is enough to satisfy one that in most cases the imagination of the writer was the chief reliance for the facts furnished. For instance, Appleton's Encyclopedia gives the estimated number of sheep in Montana for the years 1885-6-7 at two millions, yet during that period, in the hard winter of 1886-7, it is estimated that half the sheep in the state perished from severe cold for lack of shelter and feed. And this latter estimate seems to be borne out by the assessors' returns for 1889, when the number reported for taxation was only 1,180,603, and two years later this number had only increased to 1,211,740. Since that time, owing to the general provision of shelter and feed during severe storms and deep snows, the number has steadily increased so that in 1893 the number reported by the assessors reached 2,252,527, of the assessed value of near \$6,000,000.

In two years following the passage of the Wilson-Gorman free wool bill, though the number of sheep did not decrease, the value shrank fully one-third, and the yield from the wool crop in 1895 at an average

price of 10 1-2 cents was very nearly \$2,000,000. The average price of the wool crop of 1896 did not much, if any, exceed 7 1-2 cents, and though the quantity of wool produced exceeded that of the preceding year by nearly two and a half million pounds, the amount realized from its sale was much less, and hardly reached the cost of production. During this last period of depression the number of sheep in the United States fell away nearly 10,000,000. Only in what is known as the arid belt of the country was there any increase, and now our people are reaping the reward of their faith.

ROOM FOR IMPROVEMENT.

In the very few industries in which Montana at present can compete successfully with the older settled portions of the country, none possesses more avenues for improvement or offers the sure promise of greater reward than the sheep industry. We may anticipate sharper competition from countries where the land and labor are cheaper and where less expenditure is needed for shelter and feed. And it is not unlikely that unfriendly legislation may again be encountered by those who underestimate the importance of being as far as possible independent of the rest of the world in so important an article as wool, just as essential as guns, ammunition, and battle-ships in case of war.

Without increasing the number of our sheep we can greatly improve their quality in many directions. We can increase the quantity and improve the quality of both our wool and mutton. Instead of sending to market so much dirt and grease, we can have our wool cleansed and sorted at home and present it in such shape on the market as to command ready sale at the best prices. Instead of sending our mutton sheep to other states to be fattened, we can fatten them at home on wheat, barley, oats, and alfalfa. We can send the dressed carcasses in refrigerator cars to all the great markets of the country and create home industries to utilize all the waste, from which at present we realize little or nothing. It should not be long till some of the waste power of our large rivers is utilized in the establishment of woollen mills in which some portion of our product could be furnished for use at home, without the cost of double transportation, and free from shoddy adulteration.

CO-OPERATION.

Our industry more than any other has suffered from lack of co-operation, and we anticipate the greatest benefits from the new law in bringing our sheep-owners together and teaching them to seek their particular interests through the interests of all others and thus largely promoting the general interests of our state. There are margins of expenditures to be reduced, and margins of profits to be in-

creased in many directions and details by co-operation and an intelligent study of the situation.

In connection with our annual meeting of the Board of Sheep Commissioners we might have a general meeting of all sheep-owners, and such meetings might do much to gather and circulate important information. "In the multitude of counsel there is wisdom," and in co-operation there is economy and profit.

CONCLUSION.

Against the Sheep Inspection and Indemnity Fund since the organization of the Board there have been orders drawn and approved by the Board and allowed by the State Board of Examiners to the amount of \$1,335.44, largely for the expenses of commissioners in attendance at Board meetings and for cost of inspection. The detailed account of this fund may be seen in the forthcoming State Auditor's report.

Particular attention is called to Table 3, Appendix "A," concerning the general healthy condition of our sheep, which so fully sustains what we have claimed for the adaptability of our conditions to successful sheep-raising, and testifies forcibly to the care exercised by our sheep growers and inspectors.

The act creating the Commission given as Appendix "B," and a copy of the Rules and Order of Business as adopted by the Commission, March 22, 1897, amended October 12, 1897, as to date of annual meeting, is herewith given as Appendix "C."

Our State Veterinarian, Dr. M. E. Knowles, has rendered valuable aid to the Board in many ways, and his report, hereto appended as Appendix "D," upon many of the most common diseases of sheep, should be read and remembered by everyone engaged in the business.

With the subjoined compilation of statistics, carefully gathered by the Commissioners of the various counties, we submit this our first annual report.

T. C. POWER,
President.

CORNELIUS HEDGES,
Secretary.

APPENDIX "A", Table 1.

(COMPILED FROM REPORTS OF THE COMMISSIONERS.)

COUNTIES.	No. of sheep on hand March 1st, 1897.	No. of sheep brought in from other states since March 1st, 1897.	No. of lambs bred since March 1st, 1897.	No. of lambs and sheep slaughtered or sold and shipped out of the state since March 1st 1897.
Beaverhead.....	74,686	8,250	33,000	18,050
Broadwater.....	32,000	3,000	15,500	9,000
Carbon.....	100,330	.....	44,000	16,000
Cascade.....	135,417	.....	69,801	34,982
Choteau.....	502,100	1,800	120,000	95,000
Custer.....	300,600	20,000	110,000	75,000
Dawson.....	131,364	.....	45,974	35,600
Deer Lodge.....	57,740	12,000	23,200	10,050
Fergus.....	514,256	8,256	218,000	186,607
Flathead.....	159	.....	100	.....
Gallatin.....	13,500	.....	5,000	3,000
Granite.....	5,454	.....	2,181	2,500
Jefferson.....	62	.....	.....	.....
Lewis and Clarke.....	41,550	.....	20,775	15,000
Madison.....	46,500	.....	17,000	8,500
Meagher.....	323,675	.....	132,700	37,300
Missoula.....	5,000	.....	2,500	.....
Park.....	43,377	.....	14,459	13,888
Ravalli.....	23,851	.....	10,732	13,000
Silver Bow.....	3,487	4,194	819	11,730
Sweet Grass.....	240,000	100	50,000	60,000
Teton.....	242,760	27	121,978	47,985
Valley.....	73,556	36,000	20,767	4,025
Yellowstone.....	210,000	5,000	100,500	35,375
Totals.....	3,120,831	98,627	1,178,986	727,592

APPENDIX "A", Table 2.

COUNTIES.	No. of pounds of pelts sold since M ^{ch} 1st, 1897.	Esti. ave price received for pelts per pound.	No. of pounds of wool sheared since March 1st, 1897.	Highest price received for wool per pound.	Lowest price received for wool per pound.	Average price received for wool per pound.
Beaverhead.....	12,000	6½c	597,490	12½c	9½c	11 c
Broadwater.....	2,500	.....	224,000	12¾	11½	12½
Carbon.....	12,000	5	800,000	14	9	11½
Cascade.....	12,660	6	1,014,574	13½	10	12.46
Choteau.....	37,000	4½	3,639,500	14½	9½	.....
Custer.....	90,000	5½	1,875,000	13½	10	11¼
Dawson.....	45,000	5½	1,200,000	12¾	10	11½
Deer Lodge.....	17,000	6½	385,748	12	9	10¼
Fergus.....	143,565	5½	3,505,557	.....	.....	12.9
Flathead.....	.....	.....	1,200	.....	.....	12
Gallatin.....	800	6½	139,400	15	10	.....
Granite.....	3,000	6¾	30,000	11	9	10
Jefferson.....	.....	.....	.....	.....	.....	.....
Lewis and Clarke.....	2,700	5¼	276,818	.....	.....	12½
Madison.....	4,000	5	325,000	11¾	8	10½
Meagher.....	15,000	5	2,185,607	15½	8	11½
Missoula.....	3,000	6	35,000	12	12	12
Park.....	6,000	4	325,327	14	9	11½
Ravalli.....	6,000	7	200,000	10¼	10	10½
Silver Bow.....	47,312	6	28,819	12	10	11
Sweet Grass.....	8,000	6	1,650,000	13	8	.....
Teton.....	36,080	5½	1,773,072	13½	11¼	12.33
Valley.....	5,250	.....	419,149	12½	9	10¾
Yellowstone.....	78,400	6	1,508,600	15½	10	12
Total.....	587,267	5.74	22,169,921	13.11	9.64	11.48
	Genl. Av	Genl. Av	Total.	Genl. Av	Genl. Av	Genl. Av.

APPENDIX "A", Table 3.

(COMPILED FROM REPORTS OF THE COMMISSIONERS.)

COUNTY.	General Health and Condition of Flocks.	General details of any scab or other infectious disease existing between March 1st, and October 1st, 1897.
Beaverhead.....	Never was better. Small losses and large increase the past season.....	No known scab has been in the county.
Broadwater.....	Good	No scab. Absolutely healthy.
Carbon.....	Good. Only two part'es have dipped and they for ticks.....	No reports of any disease whatsoever.
Cascade.....	Flocks have all been reported in ' healthy condition.....	No disease known to exist.
Choteau.....	Excellent.....	No case of scab in the county.
Custer.....	General health excellent. Flesh con- ditious fair. In some sections es- pecially good.....	No scab found in the county.
Dawson.....	The general condition of the sheep in the county is excellent.....	There has been no scab or other disease among sheep in the county during the year.
Deer Lodge....	The industry is in a healthy and flourishing condition.....	Quite a number of sheep from infected districts have passed through the county yet the sheep at present are free from any contagious disease whatever.
Fergus.....	All sheep in the county reported in fine condition	No case of scab reported in the county.
Flathead.....	Good.	No disease
Gallatin.....	Good. ....	.....
Granite.....	Good	No scab or diseases reported.
Jefferson.....	.....	.....
Lewis and Clarke	Good.....	No trouble.
Madison.....	Good.....	Only one case of scab reported, which was in a band brought from Idaho. They were dipped three times and are still quarantined.
Meagher.....	First rate.....	No scab or other infectious disease heard of.
Missoula.....	Good.....	No scab or other infectious disease known to exist.
Park.....	Good.....	No infectious disease known.
Ravalli.....	Good.....	No scab or other infectious disease has been reported.
Silver Bow.....	Good.....	No scab or any disease.
Sweet*Grass....	Good.....	None.
Teton.....	The sheep of Teton County were never in better condition than at present ..	Their health seems to be perfect. There is absolutely no infectious disease exist- ing within the confines of Teton county among sheep.
Valley.....	Good. And they will go into winter in good shape.....	There has been no scab or other infectious disease as far as learned.
Yellowstone....	Health excellent. Condition good.	No scab or other infectious or contagious disease.

APPENDIX "B".

ACT CREATING THE BOARD OF SHEEP COMMISSIONERS.

SENATE BILL NO 100.

An Act to provide for the appointment of a Board of Sheep Commissioners and to define their powers and duties.

Be it enacted by the Legislative Assembly of the State of Montana:

Section 1. The Governor of the State of Montana with the consent of the Senate is hereby directed and empowered to appoint a Board of Sheep Commissioners consisting of one member from each of the counties of the State. The members of said Board, before entering upon their duties, shall each take the oath of office prescribed by the Constitution, which oath of office must be filed in the office of the Secretary of State.

Section 2. Each member of said Board shall be a qualified elector of the county from which he is chosen, and an owner of sheep within the State and must reside, during his term of office, within such county. The members of said Board shall hold office for a term of two years or until their successors are appointed and qualified, and in case of a vacancy in said Board from death, resignation or otherwise, the Governor must fill such vacancy by appointment.

Section 3. The said Board must organize by electing one of its members as President, and the Board is authorized to appoint a Secretary, which Secretary shall receive such compensation as may be allowed by said Board. The members of said Board shall receive actual expenses incurred by them in the performance of their duties, but shall receive no compensation for their services.

Section 4. The Board may divide the State into suitable districts for inspection purposes and provide for inspectors when necessary. It shall be the duty of the Board to exercise a general supervision over and so far as practicable to protect the sheep interests of the State from theft and disease, and devise and recommend from time to time such legislation as in their judgment will foster and develop the sheep industry of the State. The Board may employ all proper and lawful means to procure the attendance of witnesses and may employ attorneys to advise the Board and to assist in the prosecution of any person or persons guilty of any offense against the laws of the State, or any crime or misdemeanor under any of the laws of the State for the protection of the rights and interests of sheep owners. The Board shall have power to make rules and regulations for its own government, and may convene whenever necessary, provided that there shall be at least one meeting of said Board each year. The duties of the Secretary shall be such as may be prescribed by the Board.

Section 5. It is the duty of the Board to audit all bills for expenses

incurred in the protection or fostering of sheep industry incurred under the provisions of this act, and if found correct to certify the same to the State Auditor, who shall draw a warrant on the State Treasurer in favor of the party or parties entitled to such compensation in the sum so certified, payable out of the "Sheep Inspection and Indemnity Fund."

Section 6. The Board must make an annual report, in writing, to the Governor on the thirtieth day of November of each year. Such report must give a complete statement of the transactions of the Board during the year.

Section 7. The Board of County Commissioners, at the time of the annual levying of taxes, must levy a tax of one-half of one mill on every dollar of the assessed value of all sheep in their respective counties to be collected as are other taxes, and paid (to) the State Treasurer, who must keep the same as a separate fund to be known as the Sheep Inspection and Indemnity Fund, which fund must be used in defraying any expenses of Deputy Sheep Inspectors and all other expenses incurred under the provisions of this act except the salary of the State Veterinary Surgeon, but at no time shall any warrant be drawn upon this fund in excess of the amount of money in said fund or to exceed the amount of taxes collected and paid in.

Section 8. The Board first appointed shall convene in the City of Helena upon a date to be named by the Governor, which date shall not be later than April 15, 1897.

Section 9. Whenever any Deputy Inspector files in the office of the State Auditor proper vouchers, duly approved by the Board of Sheep Commissioners, setting forth:

1. The name in full of such Deputy Inspector.
2. The kind and nature of the services rendered.
3. The particular locality when (where?) the work was done.
4. The time and length of time employed.
5. The number of sheep inspected and the name of the owner or person in charge.
6. The disease or diseases treated and the number treated for each disease and the length of time of such treatment and the result.
7. The amount claimed and the value of such services, the State Auditor must audit the same and if found correct, draw a warrant in favor of such Deputy Inspector, payable out of any moneys in the "Sheep Inspection and Indemnity Fund."

Section 10. The Board of Sheep Commissioners must, upon request of any organized wool growers' association in the State, or of any three sheep owners in any county, or upon the request of the State Veterinary Surgeon, appoint a capable person as Deputy Inspector in such county, who shall hold his office during the pleasure of the Board and must perform the duties prescribed for him by the Political Code.

Section 11. Any and all Acts and parts of Acts in conflict with this Act are hereby repealed.

Section 12. This Act shall be in full force and effect from and after its passage.

Approved March 5th, 1897.

APPENDIX "C"

STATE BOARD OF SHEEP COMMISSIONERS.

RULES AND ORDER OF BUSINESS.

I.

Each county in the State shall constitute an inspection district.

II.

One Inspector shall be appointed for each district and receive such compensation as is provided by law.

III.

Inspectors shall be named by the Sheep Commissioner acting for the county in which they are to serve, and be confirmed by the Board.

IV.

Inspectors shall be under the supervision and direction of the Sheep Commissioner of the county in which they serve, when not conflicting with the established general supervisory prerogatives of the State Veterinarian.

V.

It shall be the duty of the Sheep Commissioner of each county to take an active interest in all matters pertaining to the sheep and wool-growing industry in his county, making a written report to the President of the Board not later than October first of each year, of all matters coming under his supervision, more especially showing in detail the number, age and kind of sheep slaughtered or shipped out of the State from said county, giving names of the parties disposing of same; also to show the number of pounds of wool marketed from that county, giving the names of the owners thereof. The Commissioners shall be reimbursed for all actual expenses incurred in the performance of these duties, as provided by law, and it shall be the duty of the Secretary of the Board to furnish suitable blanks and stationery to each Commissioner for his use in performing the duties herein prescribed.

VI.

The President and Secretary shall have authority to investigate and approve or disapprove all claims against the State "Sheep Inspection and Indemnity Fund," and report the same to subsequent regular or special meetings of the Board.

VII.

The annual meeting of the Board shall be held in the office of the Board on the first Monday of December of each year. The President shall have authority to call a special meeting at any time whenever in his judgment it is advisable to do so. He shall call a meeting of the Board upon the written request of a majority of the Commissioners. At any regular or special meeting the presence of five members shall constitute a quorum for the transaction of business, and the order of business shall be as follows:

1. Calling the roll.
2. Reading minutes of the previous meeting.
3. Reports of officers.
4. Reports of committees.
5. Unfinished business, and
6. General business.

VIII.

These Rules and Order of Business may be amended or abolished by a majority vote of the members present at any regular meeting, without previous notice.

 APPENDIX "D"

 REPORT OF STATE VETERINARIAN.

November 13, 1897.

To the Honorable Board of Sheep Commissioners,

Helena, Montana.

Gentlemen:—I beg to herewith submit my report as State Veterinarian relative to that part of my duties concerning sheep. On this date, November 1st, 1897, there is not one case of scab within our borders, nor is there any other infectious or contagious disease of any importance affecting our sheep. The natural conditions in Montana are conducive to health in sheep and the active vigilance that we exercise in inspecting all sheep entering, leaving or in transit through our State will, without doubt, keep our borders ever free from infectious diseases of any nature.

I desire herein to extend my sincere thanks to the Sheep Commission for the hearty support given me in all my actions, and can only

say in return that I will be ever in readiness to respond to any call from your Honorable Body.

Respectfully,

M. E. KNOWLES,
State Veterinarian.

THE DISINFECTION OF RAILWAY CARS.

The importance to Montana sheepmen in shipping their sheep both to market, and into our State, in properly disinfected railway cars, is so vast that each individual sheep-owner should take cognizance of it, and request the disinfection of stock cars before any healthy animals are entrusted to the care of the railway companies. Beyond doubt, Montana is at present absolutely free from scab, or other infectious sheep diseases, and this fact alone is accountable for many of the large and remunerative sales that are made throughout the State. But without protection by the disinfection of railway cars, our sheep are quite likely to receive unjust censure among eastern buyers, on account of bringing diseases among the small feeders of the east by becoming infected in transit through the medium of contaminated cars, or on account of being unloaded into pens wherein sheep suffering from scab, or other infectious diseases, have been unloaded. We know that there are many localities throughout Wyoming, Oregon and Washington that are permanently scab-infected areas. Now, should a consignment of diseased sheep be sent from any of these localities, then, immediately after unloading in the Chicago market, the same cars should be returned to Montana for another shipment, providing said cars are not disinfected before they are returned, they are likely to convey scab to our healthy sheep, or other infectious diseases; and as it will take a number of days for the disease to manifest itself among healthy sheep, the disease is given just about sufficient time, from the unloading at Chicago, or other mart, out of disinfected cars, and probably into disinfected pens, to break out immediately after being shipped in to some of the small feeders of Illinois, Ohio, Indiana, and other Central States. One should keep the fact in mind constantly that these sheep are in health and free from infection when they leave our borders, but the buyer who has the scab break out among his sheep in Indiana, Illinois, or other Central States, will believe, from the fact that the sheep he buys do have scab, and are known as Montana sheep, that they became infected before leaving our borders. This, any one can see, is a serious detriment to our interests, and has frequently been the occasion of feeders in the Central States refusing to buy Montana sheep, from the fact that they have the reputation of conveying scab.

In the event of action being taken in this regard by our railway companies, there would be no further possibility of such contamination, and our products of the flock would be in demand throughout the feeding area of our country.

During the early spring I had quite a controversy with Jos. E. Wing, of Ohio, (who is an extensive feeder and breeder of sheep in that state,) through the columns of the "Breeder's Gazette," Chicago. Mr. Wing claimed that all Western States were permanently infected with scab, and that the danger of conveying some infectious disease to their flocks was so great as to justify the feeders of Eastern States in refusing to purchase our product. I believe that my controverting this statement of Mr. Wing's has been the means of allaying this suspicion, at least as regards the readers of the "Breeder's Gazette," for since that time dozens of inquiries by mail have been answered by me relative to the location of different kinds of sheep in this State which were for sale, many of the letters stating that, on account of the freedom of Montana sheep from scab they would be willing to pay higher prices for them.

I believe that, if the sheep interests of Montana would demand of our railroads that they properly disinfect their cars, and set aside unloading pens, specially designating such pens as those for the reception only of such sheep as were accompanied by health certificates, that the result would be apparent at once; and if we could impress upon the railroads the necessity of this measure, I feel sure that they would promptly comply with our wishes.

PARASITES OF SHEEP.

Psoroptic Scab, or Common Scab.

The parasitic diseases of sheep, not immediately or necessarily fatal, are so numerous in so many localities of our country as to impress forcibly upon us the importance of protecting our sheep interests against them. For this purpose I desire here to give a brief outline of diseases of this character which we may be called upon to cope with.

While our borders are at present absolutely free from scab, the knowledge of this disease should be as wide as it is possible to make it, and I know of no better method of educating our sheep-men in this respect than by inserting here a brief description of the disease and its treatment, and if it is our misfortune to have an outbreak of it, it would be wise for the different sheep inspectors of the various counties of the state to visit the locality where the disease makes itself known, and make themselves practically acquainted with it.

In examining for scab one should be exceedingly careful in every particular. It is well to have an assistant or two, in going through a suspicious flock, to secure the sheep and hold them until the examiner can carefully go over all the body of the animal. Ordinarily the scab first makes its appearance along the back, the rump, or flank. It is often very difficult indeed for the most skillful examiner to state positively that the animal is suffering from scab where the examination is made with the naked eye. To avoid the possibility of error on account of defective vision or inexperience, each inspector, or sheep-owner interested,

should procure a small pocket magnifying glass with the power of three or four diameters. It is well enough to collect a little scraping of the skin or wool from the apparently diseased locality, lay it upon a plate, or some place where bright sun-light can shine upon it, and where heat can be produced as well as light, and with the aid of the glass, examine carefully this scraping. It would not be proper for an ordinary observer to state that a sheep was suffering from scab should the insect or scab mite not be apparent. The mere manifestation of some irritative skin eruption, where possibly all the other symptoms of scab are apparently present, without the appearance of the parasite itself, will not justify the examiner in the assertion that such a sheep is infected. Ordinarily the first symptoms noticed in an outbreak of scab is a great amount of irritability manifested by the animal, causing it to bite, rub, and scratch itself. The wool has a rough, felted and taggy appearance. The scratching is of course more intense when the sheep are confined in a warm corral, or when the sun shines warm upon them. By examining carefully a duly infected spot, small circumscribed elevations appear, which differ from the healthy skin, they being yellowish or white. The insects themselves can often be discovered among the hairs, a short distance from the bites, or eruptions, and as the insects multiply in number, the elevations become decidedly more conspicuous and numerous, growing closer and closer together, until over a considerable area they are united. From the center of these little mounds or papules, a watery, half bloody, or amber-colored fluid will escape or accumulate, converting into vesicles or pustules, and covering them with thin crusts. In a very few days the entire surface becomes seered over with a greasy layer, manifesting a scaly character, and under which the scab parasites hide. As the eruption increases, the layer mentioned gradually thickens, on account of the continual exudate, and constantly increasing number of insects find their home beneath it.

In the later stages of infection with scab, the fleece shows a typical roughness, the wool sticking together in mass. Often in others apparently sound, it can be easily pulled off. The intense rubbing and tearing of the skin persisted in by the animal tends to tear away the wool, and increases the intense irritation of the skin, which often becomes swollen and terribly inflamed, ultimately ending in the sloughing off of the irritated part.

In psoroptic scab the insect seeks the longest and heaviest wool, beginning the disease along the back and spine, extending to the rump, the flanks, and the lower portion of the neck, and being frequently discovered in the locality of the abdomen and chest, showing a tendency to aggregate on circumscribed areas, the scales and scabs produced increasing continually at their circumferences. The number is dependent on the aggregate of the infected localities. Small numbers of this parasite are present in the diseased parts of long standing, the edges frequently

showing them in swarms and colonies. They resemble white spots, with a brownish-gray extremity. Being selected and secured on a pointed stick, or knife-blade, and transferred to the palm of the hand, they will soon be observed moving. The young of this parasite presents six legs, and the adults eight. The six-legged young, the eight-legged adults, the sexes, couples joined together, and the eggs of this insect can easily be identified by the aid of a low-power magnifying glass.

There are many methods by which scab is propagated; the leaving of tags of wool on the trail or road; the rubbing of trees, fence-posts, wire fences, etc., and from the fact that these insects live at moderate temperature on pieces of scab or wool from twenty to thirty days, it is very essential that wherever the disease appears, our citizens should never cease to be vigilant.

Our climatic influences are decidedly detrimental to the development of any species of scab. In fact, extreme cold is generally fatal to the growth or development of this insect.

The treatment of scab is of great importance to the sheep-owner, for his ability to cope with the disease largely influences its continuance in a locality, or the successful stamping out of the pest. The successful treatment of scab depends upon the remedy used and the thoroughness with which it is applied. It is, I believe, a conceded fact that the best method of applying any dip is to always, whether in winter or summer, have the same as uniformly hot as the sheep can bear it. In my opinion, the reliable tobacco dips are the safest and most economical of all. I do not mean herein to recommend any special dip, and can only say that the tobacco dips which come from a reliable and trustworthy firm are the ones that should be used in preference to all others, and as nicotine is the principle in tobacco that is fatal to the scab mite, the most economical and safest dip to buy is the one containing the highest percentage of nicotine. It would be well for the sheep-owner to purchase nicotine in as pure a form as possible, so that he may avoid paying the excessive freights which would be necessary in the event of the dip, or nicotine, being diluted with water at the factory.

The tobacco dip is also probably the safest and cheapest to be used in dipping for ticks on sheep. In speaking of this matter recently to Sheep Commissioner David Hilger, of Fergus County, who has had a large experience in dipping sheep for tick, he very highly praised Scab-Cura, which is simply a nicotine dip. He says, however, that the high dilution of Scab-Cura, or, one of their quart bottles to 150 gallons of water, is not effectual, but that, by using one bottle to a hundred gallons of water, all the ticks are effectually killed by one dipping.

TAPE-WORM OF SHEEP.

Taenia Marginata.

As this tape-worm is inimical to the health of our sheep, and since

it has been discovered in a number of flocks in Montana, I desire to call the attention of our sheep-men to it, and copy herein from the "Animal Parasites of Sheep," by Cooper Curtis, D. V. S., M. D., published in 1890 by the United States Agricultural Department. A portion of this report on the tape-worm cannot fail to be of value to all sheep-owners. It is to be hoped that the advice and information given in Dr. Curtis' report will be followed as closely as possible by our sheep-men, as it offers a certain method of preventing the losses due to the worm. I copy the following:

"Description:—*Taenia marginata*, Batsch. *Taenia cysticerci tenuicollis*, Kuch., is the largest of the taenia infesting dogs. It is usually, when mature, about a yard long. Large specimens may be stretched, when fresh, until they are 2-1-2 yards long. The greater number of specimens are, when contracted, under a yard long. The width of the worms also depends on their degree of contraction, the more contracted specimens being the widest. The average of relaxed specimens is about two-fifths of an inch. The same specimens, when alive, might contract so much as to measure three-fourths of an inch. The width of the worm gradually widens from its head for four-fifths of its length, and then contracts slightly to the end. This species is moderately thick, measuring a little over a twenty-fifth of an inch where thickest. When first taken, its appearance is white and opaque, but when kept in water it becomes partially transparent. It then resembles a whitened, pliable band of gelatine. At its small end is the so-called head, which is separated from the body by scarcely any constricted neck. The head is quadrangular, is about one-twenty-fifth of an inch in diameter, and has a circlet of from thirty-two to forty hooks at its apex, and four moderate sized suckers. The specimen figured contained twenty-eight. These hooks and suckers serve to anchor the parasite to the intestinal walls. The neck is short, and at a little distance from the head shows the division into segments, which become plainer and plainer towards the end of the body. The segments are at first very short and broad, but gradually lengthening become square where the animal is widest when relaxed, and about twice as long as broad at the end. The terminal segments measure about one-fourth of an inch wide, and one-half inch long. There is no alimentary tract, the office of absorption of food being filled by the skin. Motion is effected by muscular bundles situated beneath the skin, which give a variety of vermicular movements. A primitive nervous organization has been described. The entire length of the worm is traversed by two canals connected in each joint by a cross system. This system is said to serve as an excretory apparatus. It has been called a vascular system. Each adult segment contains a complete hermaphroditic generative apparatus. They begin to appear in the first third of the animal, and gradually mature toward the last segment. At about the middle the eggs become fertilized and develop until the end. The terminal

segments when ripe separate and pass away. In this way the segments, which were once near the head, become central and finally terminal, growing adult, maturing their embryo, and passing away in turn. The embryonic shells are 0.036 mm, about one-seven-hundredths of an inch thick. The embryo is six-hooked. These worms mature and liberate segments in the dog in about ten or twelve weeks after the cysticercus has been swallowed.

Occurrence.—The marginate tape-worm is found at about the middle of the small intestine, therein differing from *Taenia serrata*, *T. coenurus* and *T. cucumerina*, which live nearer the end of the small intestine. They may be found in dogs of any age. Shepherd or collies, hounds, and slaughter-house dogs are most liable to be infected. City dogs, which have but little opportunity of being infected, rarely contain the parasite.

Disease.—The harm that the parasite does the dog seems to be inconsiderable. Were it not that the cysticercal stage does harm to sheep, it might well pass unnoticed by the flock-master. The ease with which one can rid his dogs of the parasites seems to place the destruction of the species in his hands. For *Taenia marginata* alone the administration of an effective taenicide every two months would be sufficient; but as *T. coenurus* develops in three or four weeks, it would be best to treat for both at once, and dose the dogs more frequently.

Diagnosis.—Every sheep-owner should proceed to dose his dogs with worm medicine, whether they are known to have the tape-worms or not. The diagnosis of tape-worms in dogs is difficult, those having many of them showing no symptoms. Sometimes they may be suspected from the leanness of the animals, or from the little white segments they pass. Such are the benefits arising from thorough medication that the time and expense given is well laid out.

Medical Treatment.—The method of treatment consists in tying the dog and withholding its supper, not water, over night. Some administer a physic at this time. The special worm medicine chosen should be given on the next morning, and followed two hours later by a dose of physic. The worms, if the treatment has been effective, should be voided inside of twelve or eighteen hours. The dog should be fed sparingly for a day or two preceding the operation. The preparatory physic may be omitted. The dog may be fed at noon on milk or meat. He should not be loosened until the following day. The excreta passed should be burned or buried in some safe place. The method of administering the medicine is as follows: A man of whom the dog is not afraid should place himself in a corner and back the dog between his legs. He should then grasp the muzzle gently but firmly in one hand; with the other hand he should pull out the loose check at the corner of the mouth. Into the pocket thus formed an assistant can put the medicine, a desert-spoonful at a time. The lips should then be held close, and the dog will usually move his tongue sufficiently to swallow

the dose. Should he refuse, his nostrils may be closed for a second or two until he gasps for breath, when the medicine will be swallowed. If any considerable quantity is to be given, the operation should not be hurried, and should be persevered in with care and patience. Some dogs will eat their medicine with milk or soup, while others are very fastidious.

Areca nut has proven itself the best taenicide for dogs. The freshly ground powder is the best. The rule for measuring the dose is to allow two grains of the powder for each pound of the dog's weight. The powder is thoroughly stirred with soup or milk. If refused, another dose may be prepared by mixing it with butter or molasses until the mass is quite soft, and administered by hand. Follow the medicine in two hours by a table-spoonful of castor-oil for a moderate sized dog. The oil can be given alone, or well shaken and mixed with three times the quantity of milk.

If areca nut is not available, a dose consisting of a teaspoonful of turpentine and two table-spoonfuls of castor oil, thoroughly mixed with a coffee-cup full of milk, may be substituted. The dose is one for an average sized farm dog. The final physic is not given in this case. A 2-ounce dose of castor-oil will bring away portions of the tape-worms, and sometimes the heads, without the aid of other worm medicine.

Finley Dun recommends the following prescription: Take 20 drops of the oil of male-shieldfern, 30 of the oil of turpentine, and 60 of ether. Beat them together with one egg and give it to the dog in soup.

Zurn advises the use of about 4 drams of freshly powdered areca nut for a very large sized dog, 2 1-2 for a medium sized, and 1 dram for a very small dog. The powder is to be rubbed up with butter. Follow in two hours by a table-spoonful of castor-oil.

Dr. Hagan advises treatment of all sheep dogs each Spring and Fall, thereby claiming an increased immunity for the sheep from the cysticerci. He recommends the following:

Take of the oxide of copper 80 grains, of powdered chalk and Armenian bolus 40 grains each; of water sufficient to mix the ingredients into an adherent mass; divide into 100 pills; administer one three times daily for ten days by crushing them into a piece of meat or bread and butter.

In addition to other remedies, Roll prescribes the following: (Each dose is for large dogs. For smaller ones proportionately less ought to be given). (1) Extract of male-fern and the powder of male-fern, 2 drams each. (2) A decoction of 2 1-2 ounces of pomgranate-root bark in water, reduced to six fluid ounces, and add one dram of extract of male-fern, to be given in two doses, an hour apart. (3) From one-half to one ounce kousso formed into pills, with honey or molasses, and a little meal. (4) From 1 1-2 to 2 1-2 drams of Kamala stirred with honey or water, and given in two doses inside of an hour. He advises a preliminary operation by feeding the dogs sparingly for

two or three days previous on salted food, and the administration of castor-oil the evening before. The remedies proposed are to be mixed with some material to make them fairly acceptable to the patients. With the exception of kamala, which acts as a cathartic, all should be followed in two hours by castor-oil.

After any treatment the patients should be fed with some liquid diet on the first day. After this they may receive any wholesome food.

The necessity of repeating a treatment depends entirely upon the efficiency of the first, and the care exercised in preventing a re-infection. If the treatment has been successful in removing the worms, heads, and all, of course no further treatment will be required. If only portions have been removed, then another dosing is necessary. For *Taenia marginata* another treatment need not occur under eight weeks, for the tape-worm is harmless, as far as sheep are concerned, up to that period, for, as far as is known, the worm will not throw off segments before that time. For *T. coenurus* the treatment should be repeated in about two weeks.

Preventive Treatment.—The great resource of the flock-master lies in prevention. In this he has nearly absolute control over the health of sheep, in so far as *Taenia marginata* and *T. coenurus* are concerned. As the dogs can only get these taenia from eating the viscera of the sheep, all the viscera of slaughtered or dead sheep should be withheld from them, and either buried, burned, or rendered.

Police Sanitation.—Sheep-killing dogs should be destroyed. Each owner should keep his dogs at home, so that all strange dogs may be killed in order to prevent them from harming sheep and scattering the taenia eggs far and wide over the pastures and in the drinking places. Dog laws ought to be made sufficiently stringent and adequate for the protection of sheep.

GID, OR STAGGERS.

Taenia Coenurus, Kuch.

As numbers of inquiries come to this office relative to *Gid*, or *Staggers*, or so-called *turnsick* in sheep, I also here append a well written description, etc., of this disease, by Dr. Curtis, in the report previously referred to, viz: "The Animal Parasites of Sheep," and as the disease is one that should be prevented, it should receive the attention of all our sheep-owners, I would ask that every owner in the state read carefully this valuable article, and profit by the estimable advice therein given.

I copy as follows from the report mentioned:

"The disease which is popularly known as *gid*, *sturdy*, *staggers*, or *turnsick* in sheep, is caused by the presence of a parasite living in the brain. This parasite is closely related to *Taenia marginata*. It lives in about the same way, but differs from it in detail. It is known as *T. coenurus*

in its adult state, and as *Coenurus cerebralis* in its cystic state—the stage in which it infects sheep.

Method of Infection.—Sheep become infected with this dangerous parasite while pasturing or drinking where dogs have scattered the eggs in their wanderings through the country. In the West the eggs may also be scattered by wolves, coyotes, and foxes which may harbor the adult parasite.

Life History.—The eggs of *Taenia coenurus*, after being taken with the food or drink, are hatched within the stomach of the sheep, and make their way through its walls. They then migrate either actively, by forcing their way through the connected tissues, or passively, as is generally believed to be the case, by getting into the circulatory system, and are carried from thence into various portions of the body. Those arriving in the spinal canal and cranial cavity seem to thrive and grow, while the others, which may have reached the heart, lungs, and diaphragm grow for a time and then perish.

Description of Cystic Stage.—Having arrived in the brain cavity, the young embryo migrates upon the surface of the brain much as the embryo of *Taenia marginata* does through the liver substance. The galleries it makes are sinuous. They begin at a point and slowly increase with the growth of the parasite and run in any direction. In from two to three months after the first invasion of the brain, the cysts have grown as large as a hazel-nut, or about a half-inch in diameter. When examined closely they will be found encased in a thick outer skin, a sac made by the membranes of the brain. Out of these sacs the parasites may be loosened, and these resemble the cysts of *T. marginata*. It differs, however, in a very important particular—instead of having a single knob attached, tens or hundreds of these knobs may be seen as little dots hanging from the inner surface into the fluid of the cavity. (See Figs. 3 and 4.) Each of these dots can avert itself, or push its head out, and will then be seen by the aid of a glass to be a perfectly developed head, having four suckers and a crown of about twenty-eight hooks. These heads, when the cysts are fed to dogs, may develop into as many individuals. Most of them will generally die, and only a few of the stronger will develop. Instead of the single worm which the embryo of the *T. marginata* produces, this peculiar species develops many from each of its embryos. In this there is a compensation; for while many of the *T. marginata* embryos come to maturity, but one or two of the *coenuri* survive, and thus the opportunities for the further perpetuation of the species are diminished.

Duration of Development.—Experiments have shown that the embryo may be found in the brain from two to three weeks after feeding, and is then about the size of a mustard seed. Between three and six weeks after feeding, the worst symptoms of the disease occur. The *coenurus* becomes developed in from two to three months. After this time it continues to grow in size and in the number of heads from six

to eight months, when it usually causes the destruction of the affected sheep. When the developed coenurus is fed to a dog, it usually produces adult tape-worms within a month.

In the migrations of these parasites many are lost and destroyed. Of the hundreds of eggs which leave the intestines of dogs, few reach the stomach of the sheep, and of these still fewer enter the cranium. Of the few which become adult—one or two in each sheep affected—but a small percentage nowadays arrive in the dog again. Thus of the thousands of embryos that left the dog, but a single coenurus may return. But this coenurus, developing again into several tape-worms, is the source of many new embryos for the re-infection of the sheep.

Disease.—Lambs and yearling sheep seem to be the most liable to infection; those over two years old seem to possess a degree of immunity. Sheep herded by dogs; those breeds which eat the grass close to the ground; sheep which drink out of ponds or brooks in which the dogs bathe; flocks belonging to careless flock-masters, who leave the skulls and viscera of slaughtered and dead sheep strewn through the pastures, are more liable than others. In short, any of the conditions which help in the distribution of the parasites, render sheep more subject to the disease.

Symptoms and Progress.—The symptoms of gid in sheep are dependent upon the stage of invasion and development at which the parasite has arrived. The invasion embraces the period from the time that the embryos have been swallowed to the time that they become partially developed in the brain. The stage of development embraces the remaining time they pass in the brain. The stage of invasion generally passes unnoticed. Between the second and third week those animals worst infected—for but few of those infected show signs of disease in this stage—show symptoms of inflammation of the brain and surrounding tissues. It is at this period that the little parasites are active in progressing through the tissues. Dullness, feebleness, heat in the head, intense redness of the mucous membrane of the eyes, and increased pulse-beat are characteristic of this stage. The head is generally held in a peculiar position, either stretched at length, turned backward, inclined to either side, or drooped. The intensity of these symptoms depends upon the number of invading parasites. Later, spasmodic convulsions or paralysis may occur. Death may take place in about six or eight days after the first symptoms are noticed. The diagnosis at this stage is difficult, but depends on finding the parasites and their channels on the surface of the brain. The former are at this time of the size of a mustard or flax-seed. A correct diagnosis at this stage will influence the future treatment of the flocks. If the sheep live through this stage, no further symptoms will be noticed for from four to six months, when a new set of symptoms will appear. It is said that of all infected sheep, less than 2 per cent of those which show the disease in the early stage, recover.

The symptoms of the second stage arise from two causes—from the irritation produced by the little heads thrust out of the mother bladder, and from the disturbances created by the pressure caused by the increase in size of the coenurus.

The actions from which the disease has derived its common name in all countries are especially characteristic. The head turns; the animal walks in a circle; it staggers, trembles, has convulsions, acts stupid; it becomes unable to eat or drink, and finally dies of exhaustion or paralysis. The various gaits and peculiar positions assumed by the infected animals arise from the particular location of the parasite. The length of time between the attack and death also depends on this position, some parts of the brain being more vital than others. Death occurs in a month or a month and a half after the secondary symptoms appear.

A diagnosis of the disease in this stage can be determined by an examination of the infected animal. Sometimes at this stage the parasite softens the wall of the skull by its continued pressure and the spot can be felt with the fingers. Coenuri in the spinal canal are more difficult to diagnose. They cause the sheep to stagger and walk peculiarly with the posterior extremities. Sometimes the disease is manifested by an intense itching along the back-bone, without any apparent reason. Paralysis of the hind limbs and of the rectum and bladder often result.

The gid should not be confounded with the disease caused by grubs in the nasal cavities, which sometimes produce similar symptoms. The false gid produced by the larvae of the *Estrus ovis* will cause more symptoms of a catarrh or cold in the head, and less of the turning, which is so very characteristic of true gid.

Treatment.—There is no treatment that can be profitably followed for sheep thus affected. A veterinarian could, in the more advanced cases, locate the position of the cyst either by inference from the character of the symptoms or by feeling the softened spot in the cranium. He might, by carefully cutting away, or trephining the skull over the point, remove the parasite and enable the sheep to recover. The intelligent farmer might learn to do this himself, but after it is all done, the cost of doing it will about equal the value of the sheep saved. The true treatment, and that which has saved France and Germany more than any medicinal or surgical treatment devised, consists in prevention.

Prevention lies in the treatment of the sheep and of the dogs. As the developed coenurus comes only from the cranium or spinal canal, it is very easy to prevent dogs from being infected by taking care that they cannot get these portions of the carcass, either when the sheep are slaughtered, or after they have died in the pasture or sheep-cote. The heads should either be rendered, burned, or deeply buried, and not thrown into the first convenient corner.

When the skulls and viscera must be fed to dogs, they should be subjected to a prolonged boiling. The soup so made would be harmless. When the lambs are known to have passed through the first stage of the disease and are fat enough for sale, at the very beginning of the secondary symptoms they should be slaughtered and marketed, care being taken with the first killed to verify the diagnosis. This will save more than any other proceeding. The treatment and handling of the dogs are the same as for *Taenia marginata*, except that *T. coenurus*, according to Leuckart, develops in three or four weeks, and has to be medicinally attended to oftener, or until the dogs are quite free from it.

The Adult.—*Taenia coenurus*, the adult tape-worm, which grows from the cyst and causes the gid when in the sheep's head, resembles *T. marginata* and also *T. serrata*, a tape-worm which the dog acquires by eating the viscera of rabbits in which the young form is encysted. *T. serrata* is about as large and long as *T. marginata*. *T. coenurus* is much smaller than either, measuring when mature between one and two feet, while the former measures a yard. It is also a slenderer species. The most decided differences lie in the hooks of the head. *T. serrata* has the largest head, the largest hooks, and the largest suckers, the latter being a third larger than those of *T. marginata*. They are from thirty-eight to forty-eight in number, the hooks of *T. coenurus* are between 24 and 32 in number, and the slenderest of the three species. The terminal segments also vary, those of *T. coenurus* being the smaller. The total number of joints also differ, *T. marginata* having five-hundred and fifty or six hundred; *T. serrata*, three hundred and twenty-five or three hundred and fifty, and *T. coenurus* about two hundred. Exact measurements of all these parts as given in text books, enable one to definitely determine the species, but the flock-master needs most to know that his own and his neighbor's dog harbor tape-worms, which are prejudicial to his flocks, and to proceed against them.

The presence of Hydatids (*Taenia echinococcus*, v. Siebold), (Plate XI, Figs. 7, 8 and 9,) is, if it occurs at all in this country, very rare. It has a life history similar to *T. marginata*, passing from sheep, cattle, and pigs, to dogs, and from dogs back again. In method of growth it differs, forming from a single embryo large masses of cysts, which contain many individuals capable of becoming adult. Its favorite situations in sheep are the liver and lungs. It may occur elsewhere. In these places it forms large bladdery masses, whose nature can only be definitely determined by the aid of the microscope. As this parasite is also dangerous to man, the bladders should be handled with care, and destroyed. The treatment for dogs is the same as for the other taenia.

Taenia tenella, Cobbold (Plate XI, Figs. 5 and 6), which causes mutton measles, is a tape-worm of man, and is supposed to be acquired by him while eating mutton through which the cysticerci have scattered. The disease has not yet been noticed in this country, and having been

observed but seldom in Europe, is yet problematical. Mutton affected would present little white spots as large as flax-seed scattered through it. The loin muscles are most apt to be infected. Neither this disease nor hydatids can at present be accounted a disease of sheep in this country.

LARKSPUR POISONING OF SHEEP AND CATTLE

Circular No. 1. By Courtesy of Governor Smith.

The larkspur of our country represents mostly erect annual herbs from a span to one foot in height, with palmately lobed, cleft dissected leaves and racemose flowers of usually beautiful azure blue color, shading sometimes from purple to entirely white. They belong to the family of the ranunculaceae, to which the very poisonous aconite (monkshood, or wolfsbane) belong. The flowers of the larkspurs are disposed in loose terminal racemes; the nectary is one-leaved, with an ascending horn (spur) nearly equalling the corolla. The seeds are contained in smooth solitary capsules. From May to July they are found in blossom, generally in hilly regions, and distributed over almost the whole of the western part of the United States. The flowers are bitter and acrid, and contain very probably aconite acid, an alkaloid, with very poisonous properties. The seeds also seem to contain a poisonous principle of alkaloidal character. The symptoms of larkspur poisoning resemble very closely those of aconite.

Belonging in one and the same family, it is hardly doubtful that the larkspur possesses one or more poisonous principles, in action like those found in aconite, and an early investigation and analysis of the plant is absolutely necessary in order to protect the stockmen from losses of sheep and cattle caused every year from eating larkspurs.

Here in our State, (Montana), three different kinds of delphinium (larkspur) are found. The most widely distributed one is delphinium monzicus d. c., which is growing in almost every part of the State. Delphinium monzicus d. c. is glabrous (without hairs) below, at least at the very base, pubescent above, with spreading hairs, especially in the inflorescence. The leaves are five, parted. The divisions, two or three cleft; flowers large, deep blue, in a few too many, flowered simple raceme the upper petals veined with purple; the spur long and slender. It is found in Wyoming, Montana, and northwestwards. The other two larkspurs found are delphinium bi-color and scopulorum.

From the observation of several cases of larkspur poisoning which happened in Montana early in the Spring, at a time when the blossoms and seeds had not yet been produced by the plants, it is without any doubt that the poisonous principle in larkspur is distributed throughout the whole plant (root, leaf, flowers and seeds), and therefore poisoning may occur at almost any time during the life period of the plant.

A number of serious and extensive losses among both cattle and sheep have come under my observation in Montana during the past three months, the most serious being among sheep. I ascertained upon close investigation that cattle and sheep are most likely to eat the plant and become poisoned when they are on a range and short of grass, or when turned immediately into a locality while hungry, and in a condition to eat any plant life in sight. The common symptoms of poisoning in sheep and cattle are manifested first by the animal straying behind the herd, appearing dull and indifferent to its surroundings, but if suddenly startled will walk in a directly straight line until meeting some obstruction, when it probably falls, makes but few struggles, lying remarkably quiet under the influence of the poison. There is rarely any bloating or hoven, but in nearly all cases a dribbling of saliva from the mouth, champing the jaws, and frequent attempts at swallowing.

The treatment most successfully applied had been pouring water of ammonia onto a rag or sponge, and holding the same to the animal's nose until it fully inhales the fumes of the ammonia, it sometimes being necessary to pour five or six drops of ammonia into the nostrils. The administration every ten or fifteen minutes to sheep of a teaspoonful of ammonia water in a half cup of water, and the administration of alcohol (in teaspoonful doses), diluted with three times this quantity of water every 15 or 20 minutes, will be found beneficial when ammonia does not promptly relieve the animal. Where it is possible, and the drug is accessible, a hypodermic injection of the sixtieth of a grain of atropia sulphate to sheep and one grain to cattle, will bring about a cure, or relieve the poisoning in a rapid manner, often reviving them when they are apparently beyond help. Digitalis and tincture of nux vomica in small doses are also useful, and frequently bring about a cure very promptly. Any additional information desired by interested persons will be cheerfully furnished by the State Veterinarian.

A full report of poisonous plants of Montana will be presented our stockmen at the earliest possible moment.

Respectfully submitted,

M. E. KNOWLES.

