UTAH STATE DEPARTMENT OF HEALTH

SALT LAKE CITY

July 16, 1953

Dear Sir:-

Your name was given to us by Mr. Vernon Metcalf, Secretary of the Nevada Board of Sheep Commissioners. As you know, several of the Utah sheep men who were grazing in and around your area suffered considerable loss of sheep this year. Factors which may be the predisposing causes are so numerous it has been difficult to determine which one may have been the actual cause. If you have suffered losses in your sheep this year, we would appreciate that information, as well as the following:

1. Did the adult sheep show any wool slipping (on body) or blistering on the head and face?
2. Did you suffer over normal loss of sheep at lambing (number of adults and number of lambs)?
3. Were your lambs stunted in size although full-term?
4. Did these lambs die prematurely or did they survive?
5. Have you had any of the above trouble in previous years? When?
6. Exact location of your range from November through March, in relation to the Nevada Proving Grounds?
7. Have you suffered any malnutrition losses in the past?
8. What poisonous plants have your sheep ever eaten where death or sickness has resulted?
9. If you suffered losses in adult sheep with wool slippage or deaths, were these young sheep (2 to 4 years) or older sheep?

Inclosed is stamped self-addressed envelope for your convenience in replying. Your prompt answer to the above questions will be greatly appreciated, and may aid in preventing future sheep losses in this area, in which you yourself are interested.

We thank you in advance for your courtesy and co-operation.

Sincerely,

Monroe A. Holmes *By W. N. Lee*

MONROE A. HOLMES
Veterinarian

130

MAH:UNL
ENCLS.

I have only a small flock of sheep which do not run on the ~~[illegible]~~ range. I talked with a sheep man from Cedar City yesterday and find that my sheep have all the symptoms he complains of and am sure my sheep did not suffer from poverty, but we were fairly close nearer to the bombing range. It is my conviction ...

(over)

that not only livestock but people in this area have suffered from radio activity.

There has not been much said about the results of the automic cannon that they shot off at the tail end of the demonstrations, but it broke the windows in my home and cracked the walls of cement structures on my ranch, decreased the milk flow of my dairy cows and left many of them with a feverish condition of the mouth and nose from which they are still suffering. The Automic Energy Commission disclaims any and all responsibility for any and all of this in my particular case and the only satisfaction I can get out of the situation is the knowledge that we have a terrific weapon in that automic cannon. If out of all this we can have all future demonstrations conducted out in the Pacific Ocean maybe past and present losses will not be in vain.

Sincerely

035

UTAH STATE DEPARTMENT OF HEALTH

SALT LAKE CITY

July 16, 1953

Dear Sir:

Your name was given to us by Mr. Vernon Metcalf, Secretary of the Nevada Board of Sheep Commissioners. As you know, several of the Utah sheep men who were grazing in and around your area suffered considerable loss of sheep this year. Factors which may be the predisposing causes are so numerous it has been difficult to determine which one may have been the actual cause. If you have suffered losses in your sheep this year, we would appreciate that information, as well as the following:

1. Did the adult sheep show any wool slipping (on body) or blistering on the head and face?
2. Did you suffer over normal loss of sheep at lambing (number of adults and number of lambs)?
3. Were your lambs stunted in size although full-term?
4. Did these lambs die prematurely or did they survive?
5. Have you had any of the above trouble in previous years? When?
6. Exact location of your range from November through March, in relation to the Nevada Proving Grounds?
7. Have you suffered any malnutrition losses in the past?
8. What poisonous plants have your sheep ever eaten where death or sickness has resulted?
9. If you suffered losses in adult sheep with wool slippage or deaths, were they young sheep (2 to 4 years) or older sheep?

Inclosed is stamped self-addressed envelope for your convenience in replying. Your prompt answer to the above questions will be greatly appreciated, and may aid in preventing future sheep losses in this area, in which you yourself are interested.

We thank you in advance for your courtesy and co-operation.

Sincerely,

Monroe A. Holmes
By U. N. Lee

MONROE A. HOLMES
Veterinarian

MAH:MHL
Encls.

Nev.
July 23 1953

Gentlemen:

My Ranch is located   miles east of Pioche Nevada.

I have only a small farm Flock of Sheep and they Wintered here on the Ranch.

I had a very good Lamb Crop and also a good Wool Crop

I feed a supplement before lambing

I have a healthy flock Nothing has ever been wrong with them

Yours truly

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

July 10, 1953

Dr. Monroe A. Holmes
Utah State Department of Health
Salt Lake City, Utah

Dear Holmes:

Thank you for your letter relating the latest developments in the sheep disease investigation.

Frankly, Holmes, I haven't enough information upon which to base an opinion in regard to the points you mentioned. The evidence I have doesn't warrant any definite statements on my part. I'll have to disqualify myself as "an expert" in this instance since I could render only equivocal comment. Let the fellows with the more definitive evidence do the talking. I can't fabricate a story just for the occasion.

My pathological findings, as set forth in the report, admittedly do not contribute much to the elucidation of the problem. The thyroid hyperplasia no doubt is compatible with the radiological findings as I understand them. (Other tissue changes are consistent with the findings in animals of rather poor physical condition whether due to primary undernourishment or to the debility frequently accompanying various diseases.) None of these changes is specific. I plan to send duplicates of my microscopic sections to Dr. John Rust, veterinary pathologist, Oak Ridge, Tennessee, for his opinion.

Thus far I have no information from the microscopic sections or routine bacteriological cultures which would point to an infectious agent. Nevertheless the possibility of infection shouldn't be dismissed ---even if only a complicating factor.

If there is some indication from A.E.C. and Art Wolff that radiation damage may have been involved, it appears to me a combination of radiation and some other factor(s), e.g., malnutrition or intercurrent infection, could be incriminated. The radiology experts should be in a position to comment on the deleterious effects of the quantity of radioactive substances found in their tests.

I am certain that my comments do not satisfy your query. Too much of what I might say would have to be based on rather fragmentary descriptions of the clinical picture and necropsy findings during the active stages of the

disease. Since I am not generally given to guessing under such circumstances, I can offer no more satisfactory answers.

Dr. C. B. Philip inoculated laboratory animals with the ticks and heds removed from the Cedar City sheep. To date nothing has developed with the exception of the recovery of what is apparently Colorado tick fever virus from the pooled ticks found on the sheep. Neutralization studies are to be done by Dr. Carl Eklund's laboratory to confirm this finding.

Enclosed is an addendum to my report on the microscopic findings.

Although I have a continued interest in the sheep problem, I find it necessary to state that I'll not be able to engage in future studies on the matter. My duties and interests here leave me no time for any additional outside projects. Also I believe the matter is somewhat outside of my immediate domain in the first place.

Sorry I can't be of much help at the present time. Keep in touch with me on the developments.

Sincerely,

/s/ W. J. Hadlow, DVM
Pathologist

WJH:ms

Jerada.
July 20, 1953

Dr Monroe J Holmes.
State Capitol Bld.
Salt Lake City.

Dear M-r Holmes:

Received your letter in regards to sheepmen losing sheep this spring.

I am running cattle and don't know much about what the sheep are dying from.

I have heard some rumors as to the cause. I did hear the one that the concentrates got along O. And the ones that didn't were loosing their sheep.

The feed was awful backward this year on account of the late cold spring, seems there was no nourishment in the feed, it was as dry

[illegible] are [illegible] [illegible] yet, and [illegible] will
is some that won't shed off the summer
[illegible]. We are getting some rain now
that is saving our lives. If the dry
weather would of continued, it would of
broke every cow man in the country.
There are no resident sheepmen here
most all the sheep that are run in this
vicinity are Cedar City sheepmen.
Hoping this may help solve the cause

I remain

Your Truly.

UTAH STATE AGRICULTURAL CO. E
LOGAN, UTAH

SCHOOL OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION
OFFICE OF THE DEAN AND DIRECTOR

July 20, 1953

Dr. Holmes
In Charge of Infectious Disease Division
State Department of Public Health
State Capitol Building
Salt Lake City, Utah

Dear Dr. Holmes:

I am enclosing for your information a copy of the report on livestock and range conditions submitted to the Atomic Energy Commission by L. A. Stoddart, Head of our Range Management Department. I am sure this report will be of considerable interest to you.

I assume that you have a copy of the information submitted by Drs. Shupe and Greenwood. If not, I will be glad to submit this to you at your request.

Sincerely yours,

D. A. Broadbent
Assistant Director

DAB:jg

Encl.

135

135

135-138

Report on Livestock Conditions
Adjacent to the Las Vegas
Bombing Range.

L. A. Stoddart
Range Ecologist
Utah Agric. Expt. Sta.
June 22, 1953

The following observations deal with conditions existant between June 14 and June 18, 1953. Since this was some time after bomb explosions and also well after the livestock injury occurred, the observations are necessarily inconclusive.

1. The horses wintered in the Papoose lake area are suffering from skin and eye injury of unusual character. The atomic explosions would seem to furnish the most logical explanation for this injury. Since horses travel further than any other grazing livestock, the chance of their being close to the explosion at one time or another would be good. It is important to note however, that despite obvious damage, no deaths were incurred among the horses. Their condition was good despite poor range conditions in the area being grazed by them. In general, horses probably are better able to withstand poor feed conditions than sheep or cattle.

2. The cattle wintered in the Papoose lake area were not identifyable from others presumably grazing at greater distances from the explosion center at the time of actual explosion. One heifer (slaughtered for examination) which it is claimed was in the Papoose lake area however, was in very satisfactory condition. Most cattle observed, however, especially breeding cows, were in an unsatisfactory state of nutrition. This resulted from unusually severe drought coupled, perhaps, with insufficient water developments to allow uniform range use.

Near Papoose lake the vegetation was largely wolfberry (Lycium sp.), Yucca, bud sage (Artemisia spinescens), Shadscale (Atriplex confertifolia), 4-wing Saltbush (Atriplex canescens), horsebrush (Tetradymia glabrata), rabbitbrush (Chrysothamnus), gray molly (Kochia vestita), and white sage (Eurotia lanata). This is a fairly good cattle range normally, but drought mad made it poor at the time of these observations. Horsebrush was locally abundant but this plant is doubtfully poisonous

to cattle. The soil showed slight radioactivity but the pl[illegible]owed none at the time of these observations. All important forages were tested.

At the ranch where cattle were grazing at the time of this study, drought and overuse of the range were severe. Emaciation was especially evident among cows and calves around waterholes. The forage was largely 4-wing saltbush, white sage, curly grass (Hilaria jamesii), and Indian ricegrass (Oryzopsis hymenoides). Bottom lands, where green forage was locally available, contained greasewood (Sarcobatus vermiculatus), mat saltbush (Atriplex nuttallii), and saltgrass (Distichylis spicata). Drought apparently forced at least one cow to eat lethal quantities of greasewood (an oxalate poison) since post-mortem examination indicated dangerous quantities within the paunch. Scattered loco (Astragallus sp.) occurred around waterholes but it is doubtful that it was abundant enough to be dangerous.

No reason for cattle losses was apparent in the Papoose lake area. Around the ranch, however, high death loss could be expected (1) because of drought forcing cattle to eat large quantities of greasewood and (2) because of general emaciation resulting from grazing ranges low in feed quantity, and doubtlessly low in protein and phosphorus, without supplemental feed.

3. Sheep wintering on foothill lands north of the ranch were subjected to some radiation as shown by activity in the soil at the time of these studies. Plants showed no radioactivity, however, at this time. This range was a good winter sheep range, although currently dry. It was much better than the cattle range, however. Vegetation was black sage (Artemisia nova), shadscale, budsage, curley grass, horsebrush, wolfberry, and other typical desert forage. There would seem to be no reason to expect damage from grazing this range so far as vegetation is concerned.

The diseased sheep observed were considered a typical by ranchers. A "blistered" skin around the nose would suggest photosensitivity. This might be caused by light cases of "Bighead" poisoning on the trail to summer range. The trail area was not esamined but is known to contain some Tetradymia. Ranchers generally are familiar

with this disease as seen in extreme cases and they claimed none existed in their herds this spring. Mild cases, however, may have escaped notice and could have caused the damage observed in mid June. This would not, however, explain high death losses at an earlier date.

Such sheep losses are not explainable on the basis of ranges on the animals observed but the severe emaciation seen in several herds in mid-June would suggest that poor nutrition may have been a contributing cause to high death loss and small lambs. One herd apparently lambed in early June which would surely account for "small" lambs in this instance at least!

In summary, no explanation is apparent for death losses of sheep and cattle. Injury to horses appeared to reult from the atomic explosions. Since cattle showed little or no skin injury, it is difficult to understand why cattle deaths should result from radiation when horses in the same area survived despite obvious skin injury.

UNIVERSITY OF UTAH
COLLEGE OF MEDICINE
SALT LAKE CITY

July 21, 1953

RADIOBIOLOGY LABORATORY

Dr. Monroe A. Holmes
Veterinarian
Utah State Department of Health
Salt Lake City, Utah

Dear Dr. Holmes:

Enclosed is my report on the tissue and excreta samples from the southern Utah sheep. You will note that, while we found some radioactivity, the amounts appeared to be too small to have caused acute radiation effects. Perhaps the most significant finding of this study is that about the same amounts of radioactivity were found in both the sick and the control sheep.

I do not feel qualified to make any comments on the skin lesions and radiation measurements made on the backs and heads of the sheep. However, as an example of an harmless exposure to a small area of skin in man, I would like to mention that the dose rate through the back of a radium dial wrist watch is about 1 mr./hr.

I shall be on vacation by the time you receive this report, and Dr. J.Z. Bowers has kindly consented to answer urgent questions if any should arise.

I hope that this letter and accompanying report will be of help to you in compiling your final report, and I would like to request that you use them only as an aid and do not quote me directly.

Very truly yours,

Betsy J. Stover

Betsy J. Stover,
Radiochemist

BJS:lh
cc: J.Z. Bowers, M.D.
cc: R.C. Bay D.V.M.

UTAH STATE AGRICULTURAL COL.. E
LOGAN, UTAH

SCHOOL OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION
OFFICE OF THE DEAN AND DIRECTOR

July 27, 1953

Dr. Holmes
Infectious Disease Division
State Department of Health
State Capitol Building
Salt Lake City, Utah

Dear Dr. Holmes:

Enclosed is additional information relative to the examinations of livestock in southern Utah and Nevada made by members of our staff.

I neglected to send this to you with my previous letter.

Sincerely yours,

Dee A. Broadbent Jr.

Dee A. Broadbent
Assistant Director

DAB:jg

Encl.

140

7-77

SHEEP FROM CEDAR CITY TO LOGAN, UTAH

Sheep No.	Owner
1	
2	
3	

SHEEP NO. 1

5 year old Ewe.

Emaciated with one small suppurative lesion on left mandible when brought to Logan.

BLOOD:

White Blood Count -- 7,900

Red Blood Count — 7,600,000

Hemoglobin — 11 gms.

Differential Count

Lymphocytes — 60

Neutrophiles (Segmenters) 30

Neutrophiles (Band) 1

Monocytes 2

Eosinophiles 7

POST MORTEM:

Lungs: Red hepatization throughout with three small circumscribed abcesses encapsulated in right lung.

PARASITES:

Haemonchus contortus--mild infestation. Blood sucker, stomach worst in lambs, anemia

Ostertagia circumcincta —mild infestation.

Thysanosoma actinioides—slight infestation.

SHEEP NO. 2

3 year old Ewe.

Emaciated and loss of wool over face when brought to Logan.

BLOOD:

White Blood Count 11,250

Red Blood Count 3,000,000

Hemoglobin 7 gms.

Differential Count:

Lymphocytes 65

Neutrophiles (Segmenters) 25

Neutrophiles (Band) 4

Monocytes 2

Eosinophiles 4

POST MORTEM:

Numerous adhesions in pleural cavity. Numerous small circumscribed caseous lymphadenitis like lesions through out lungs, Adhesions of liver to diaphragm.

PARASITES:

Thysanosoma actinioides—mild infestation.

Trichostrongylus—heavy infestation.

SHEEP NO. 3

4 year old Ewe.

Emaciated and loss of wool over face when brought to Logan.

BLOOD:

White Blood Count 9,950

Red Blood Count 7,510,000

Hemoglobin 11.5 gms.

Differential Count

Lymphocytes 62

Neutrophiles (Segmenters) 35

Neutrophiles (Band) 1

Monocytes 2

Eosinophiles 0

PARASITES:

Trichostrongylus--mild infestation.

Haemonchus contortus--mild infestation.

ENCLOSED PICTURES TAKEN JULY 9, 1953.

The sheep were brought to Logan, Utah, June 18, 1953. They were fed alfalfa hay and had fresh water at all times.

Sheep number one and number two were killed and autopsied July 2, 1953. The animals received no medication but marked improvement was discernable. The animals appeared more alert and active. The skin lesions on the face improved and there was a regrowth of wool in the areas suffering from alopecia. Sheep number three continues to put on flesh and appears normal.

Short

CHEMICAL ANALYSIS

By D. A. Greenwood

The attached sheet contains a summary of chemical determinations made on the blood, tissues, and stomach content of animals obtained from Nevada recently.

Most values for the different constituents appear to be in the normal range except the carotene values for specimens No. 9 and 10.

Vitamin A, carotene, phosphorus, either extract, moisture and oxalate determinations were made on the blood, tissues, rumen contents of specimens collected from animals from ranch and range allottment in Nevada.

It should be noted that the blood samples were partially hemolyzed when they were reached in Logan. The samples were old but most of the CO^2 had evaporated. The relative high values for carotene and phosphorus may be due in part to the partial hemolysis of blood.

No carotene was found in the rumen of the young heifer which was killed at the ranch. The vitamin A. content of the liver and kidney of the young heifer was lower than other samples of similar tissues from our animals in Logan.

We do not have values for these constituents of animals which normally feed on under desert range conditions. The number of animals studies were inadequate to enable one to draw satisfactory conclusions. Further studies on the nutritive state of animals raised under desert conditions are indicated.

		Vitamin A	Carotene	Phosphorus P	Oxalate (Na-Oxalate) mgm/gm.	Fat Per Cent	Moisture Per Cent
1.	Mr. Hoefs (blood) 9:00 A.M. 12-5-52.	———	———	5.76 mgm/100 ml.			
2.	2088 (blood) 6-13.	14.4 γ/100 ml.	73.6 γ/100 ml.	3.84 "			
3.	Blood Samples.	17.9 "	48.0 "	6.24 "			
4.	No. 2, 32 green (blood).	32.0 "	41.6 "	6.96 "			
5.	S. W. Wells Animal Kidney	250 I.U./100 gm.	0.25 mgm/100 gm.	175 mgm/100 gm.	0	.55	81.8
6.	S. W. Wells Animal Liver.	∞ "	0.54 "	218 "	0	1.3	73.7
7.	3 yr. old heifer kidney.	1116 "	0.38 "	218 "	0	.75	78.5
8.	3 yr. old heifer liver.	1500 "	0.53 "	300 "	0	.75	69.0
9.	Rumen. 3 yr. old heifer		0 "	63 "	0.75		79.8
10.	Papoose stomach.		0 "	212 "	8.25		6.5

∞ = very high reading

N.B. = The blood completely hemolyzed, so there is a question on the aliquot taken for Carotene.

Analytical Procedure:

The Carotene and Vitamin A were determined by the method of Kimble, M. S. J. Lab. Clin. Med., 24; 1055, (1939).

The phosphorous were determined by a modified Fiske and Subbarow method as contained in Koch and Hanke, "Practical Methods in Biochemistry," 5th edition pages 219-222. And the phosphorous in plants were determined by the method in Ref. Ind. and Eng. Chem. Anal. Ed. Vol. 7, P. 167, (1935.)

The oxalate were determined by Dakin Modification of Salkowski-Autenrieth and Barth Method. Hawk, Oser,

Notes taken at meeting of Atomic Energy Commission, State Heal[illegible]partment, Public Health Department, Livestockmen and others, held at the City a[illegible]unty Building, Cedar City, Utah, August 8, 1953, beginning at approximately [illegible] .m.

Meeting had already started when we arrived:

([illegible]):AEC: Have there been any abnormal losses since last time we were here?

Livestockman: Nothing special. Usually when an animal is suffering from Malnutrition you can put them on good feed and they will pick up and do well but this year they couldn't seem to.

(Pearson) AEC: When there is a new disease or something new comes into the area with which you are not familiar there are many symptoms that are new and different. This could be the history of anything new. Often a new disease will bring unknown circumstances, for instance "X" Disease. When the "X" Disease was first discovered in one area it took seven or eight years research before they knew what it was. There were many new circumstances that were difficult to explain and it was seven or eight years before they could say anything definite. In all that time they observed the symptoms but couldn't explain the disease. This could be a new disease or an old set of circumstances in disguise.

Livestockman ([illegible]): Generally there is an entirely new trend.

AEC:(Pearson): There have been cases where two herds of cattle were separated by just a fence and one herd had suffered and died from a Vitamin A deficiency while the other was healthy. Later it was discovered that in the one field there was some scrub Oak and the cattle were nibbling it and getting enough Vitamin A while the other herd didn't have any scrub Oak and were suffering from a Vitamin A deficiency.

([illegible]) Livestockman: Have you ever known deer and wild horses to die on the range?

AEC (Sanders or Woodruff?): Not in abnormal numbers.

Livestockman ([illegible]): My boy says he has seen deer and wild horses dead on the range.

AEC (Sanders): I have had that report but haven't been able to find any traces.

State Health Department:(Spendlove): The Wildlife service hasn't reported abnormal death losses.

AEC: This is a drier than normal year.

Livestockman: It has been a dry year alright but they had feed.

AEC: Weather Bureau records show that rain fall was 50% or normal. You just didn't get any winter moisture.

Livestockman ([illegible]): That isn't unusual in this area. We usually expect to harvest the growth that has taken place during the previous nine or ten months. We had feed.

State Health: (Mr. Spendlove?) The range management people say there was nothing in the range condition to explain unusual losses.

Livestockman: This year it was found only in this area.

Lee Broadbent (USAC): There must be some other explanation than drought.

148

74-166

[illegible] (Sanders): [illegible]
everything south of Highway 50 has been in very bad condition. [illegible]
are no cattle left in that area.

State Health (Spendlove): We are interested in the health of the sheep and in the health of the people. We are primarily interested in the health of the people but the health of the people has a relationship to the sheep. If a man has money in his wallet he has better food and health. The health of the people depends on the money they make. If sheep are poor the people are poor and if people are poor they suffer. You sheepmen are not well acquainted with the technical causes and effects of radial exposure. At this point we don't know what caused the condition. We aren't willing to be sure that it is or is not caused by radiation. The AEC is investigating from their point of view and we are trying to invistigate from your point of view. We aren't sure that there is adequate reason for these deaths. In some areas there don't seem to be any exposures and the sheep are sick too, but there seems to be some evidence that some horses have some radiation burns.

AEC (Pearson): No one has seen radiation burns on sheep. There are enough things that haven't been explained definitely yet that we feel that we should continue the investigation. The State Department of Agriculture will be right in there with these people.

Spendlove: I would like to hear more comments from livestockmen. There are many things we don't know that we would like explained.

AEC: Our view is the same. We don't know. We are still investigating.

Livestockman: Isn't it true that your investigations did show effects of radiation?

AEC: That is true but in such small amounts that they were far below the amounts necessary to kill.

Livestockman: This took us unawares. We saw something happening but didn't attribute it to anything in particular. For that reason the investigation came much later than the time of the worst symptoms.

AEC: Even Dr. Hoffman, who was down with the first group, saw the sheep at a later da than he would like to have seen them. No one from outside—The State Health Departmen the AEC, the Department of Agriculture—none of them saw the condition soon enough. When we got here, as far as the radiation in the sheep was concerned it appeared that they got most of it in May sometime. We looked at [illegible] sheep who weren't on the range and [illegible] sheep who were, and found comparable conditions in bo

Public Health (Terrill): The sheep here could have received their radiation at a late date than the sheep on the ranges. The sheep on the range would be loosing all the ti so by the time you tested them your instruments would read the same.

AEC: This is all internal. It is likely they got some radiation both here and in Nevada.

Livestockman (.): When you made your tests you mentioned some sheep were hot. What did you mean.

AEC: It is true that some sheep had relatively high values who weren't ill. The herd has as high an external value on the instruments as any.

, You said "this sheep isn't as hot", or, This is a hot one". What did you mean A dead one was usually "hot".

Sanders: Any radiation was hot. It didn't mean anything special. External reading have no consistancy.

: You stated that 300 R's was not the amount ... iation required to kill I have read that radiation is measurable by amount of loss ... ght so that if that be true the level of even less than lethal doses is measurable by ... ss of weight. mentioned Brookhaven literature.

Livestockman: Couldn't animals acquire some radiation from eating plants that had some radiation?

: There is a question in our minds as to the uptake of plants. Sheep are subject to direct fall-out but what about rub-off on plants and other factors. When trailing couldn't radiation rub off plants on the sheep? We don't know but we wonder. We want to make sure that all factors are considered in this thing. We are patient and waiting. We are not making any public statements.

AEC: We are in the same position. We don't know. We do have some data on radiation on cattle and sheep which we have collected experimentally regarding Iodine I31 up-take by sheep that have been fed experimentally and we have lambs from those ewes that are carried on.

: We can grant that there are similar effects in malnutrition as some have said. That is debatable of course. We know too, as has been suggested, that the sheep usually respond to good treatment. They didn't do that. It isn't a question of did they receive lethal doses. Any radiation could have pushed a poor sheep on to the other side.

AEC (Pearson): Mentioned photo synthesis and that fact that it had been reported. He discussed some of the possible causes.

Dr. Helms says he saw some black faced sheep who showed burns.

Livestockman: It was not observable to the point of coloration. We have a comparatival small number of black sheep in this area. Photo Synthesis takes some sun light. It was cloudy. Sheepmen, most of them, know that certain types of feed and sun light bring on that type of thing. The weather was over-cast. The weather reports can show you that it was over-cast and stormy for quite a while.

AEC: We can say that the black sheep definitely were affected.

State Health: Up there reading the reports they gave the impression that these affected sheep improved rapidly.

Livestockmen: You can look at the sheep now they haven't recuperated.

State Health: Do you have a record on weight when sold. Something to compare last year and this year?

Livestockmen: We haven't sold yet this year.

AEC: On May 24 we looked at some sheep that were in bad shape. In June they were still in bad shape, but by June 15, we couldn't find the same effects. During that time things had improved. I don't know whether the sheep got better or if the affected ones died but we couldn't find them. One sheep was picked up in bad condition , we kept tract, it healed rapidly. Did some of the sheep who had scabs on recover?

Stockmen: Some have.

State Health: Did the hair come back any different color?

Livestockmen: Some is just coming back in but it is the same color.

State Health: Is it different than photo sensitization? Stockmen: No.

ASC: That one old sheep of looks pretty good.

Livestockmen: Usually with malnutrition you can put them on feed and they respond. There were about 25 days when these sheep didn't respond to ing. It was around May

ASC: Right after lambing?

Livestockmen: Right in the process of lambing.

ASC: Were the sheep with the leasions any thinner?

Livestockman: They all looked pretty much the same. They looked pretty good then suddenly went bad.

Livestockman: The effect was as great in yearlings and dry sheep as in old sheep and pregnant ewes.

: Maybe Dr. Johnson would like to make a statement of what he saw in his first visit to my yard.

Johnson: I looked at 25 or 30 head of sheep. They were eating normally but going down all the time. They had scabs on their faces and scalds on their skin. You could pick wool off like dry asbestos. At the post-mortum you could find no internal injuries.

Stockman: Were there any indications of infectious disease?

ASC: They got no indication of infectious disease.

Dr. Johnson: There are diseases caused from deficiencies from which they die in a short time. When it is caused from a phosphorus dificiency feeding phosphorus will bring them back. Why is it if this is malnutrition in the sheep we can't put it back with feed?

ASC: We don't say that it is malnutrition. We've never said this is malnutrition.

: I have been observing that on some of those sheep many leasions were obvious. Dr. Johnson told me that all of them have some leasions. Is that true?

Johnson: That's right. There wasn't a really healthy sheep in the bunch. (ewes in pens with lambs).

: I would like to make a statement as to the operations of the men who had a similar trouble. I winter on range and about lambing time come in to the yards on hay and grain and I think Mr. was about like that. After 18 days of feeding the troubles were so great that they gave up and went out to grass. The same appeared to be true with other operations where they didn't come in to lamb.

State Health: Did any one use supplimentary feed.

Livestockman ( ): We all used supplimentary feed on the range. We used grain pellets (grain and cotton seedmeal).

State Health: That would be a balanced diet. They wouldn't have malnutrition.

Stockman: We fed for six weeks in the spring and quit about the 25th of April.

ASC (Leaders): That would mean the sheep were going down before the tests.

State Health: Is there anyone who didn't feed at all on the range.

: We didn't feed on the range. We lost just like the rest of these fellows.

State Health: We thought only one herd was given supplimentary feed.

Stockmen: No we all fed. We started around April 10.

ABC: You started feeding before the middle of March?

: We fed about six weeks and quit about the middle of April. We lost the flesh when we went into the flat. We didn't consider the Atomic Blast. We are still at a loss and would like to know what happened.

ABC: We agree on that.

Stockman: Some of us are 50 miles apart and they all came in poor.

Pearson: This is definitely something new.

State Health: I think we can discredit malnutrition.

ABC: I doubt that all this trouble could be attributed to malnutrition. It may have been a contributing factor. They were poor but I have never felt that it was due to malnutrition.

: Usually with good feed sick animals respond and we usually have a reasonably good lambing. This year our lambs were about cut in half.

ABC: You mean in lambs born or survived?

: We had a normal birth rate but only that many survived.

: Were there sheep that left the area?

Livestockman: ( ) left the area earlier than the other group but he only went to Modena. He left Panaca May 1.

State Health: Was there a herd having this affliction that wasn't in this area?

ABC: We can't answer. There are four or five who weren't in the immediate area who have the affliction but they were in a fall-out area.

Dr. Hoffman: I had a report that some of the sheep that wintered on the Arizona Strip had the same symptoms.

Livestockman: None of those men are here. We have had no report but one man I know who had sheep out there had no trouble.

State Health: Define the Strip.

Livestockmen: They tried to explain what they meant by the Arizona Strip.

: When you were here before I reported that part of my sheep ranged here and they lambed early. I didn't have any trouble with those sheep until the others came in. Some few of them were still in the yards when the others came in. Only the tag ends. None of the ones lambed early and left the yard had any effects. The tail end was still in the yards and mingled with the others. About them I don't know.

State Health: Was there any indication of sheep catching this from one an other? Did it come on all at once or did some get it then and some a week later or something like that?

: I couldn't say on scab. What ever it was they seemed to come pretty much together. They appeared to come all in one day.

State Health: What was the date?

AEC: How long were you trailing?

Stockman: About two weeks. I left the 15th of April.

State Health: Did any scab come before you trailed them.

: It hit our herd before we left Nevada.

AEC: When was that. What date?

Livestockman: I don't know. ' sheared in Nevada.

Clark: I didn't observe it until about the 20th of April when they got ready to be shorn.

Livestockman: We noticed it when we got ready to shear. It may have been there before, it wouldn't be too noticeable until we were handling them close.

State Health: Is it possible that it could have occurred on consecutive days, not all together?

Stockman: I didn't notice too much difference. was trailing them and they weakened and couldn't keep up.

State Health: I understand that radiation seems to accumulate in the bones. If an abnormal sheep was killed his bones would have quite a bit wouldn't they? Has there a comparison of those bones and healthy animals.?

AEC: A majority of fall-out is radio active "Strontium". We have made tests of these sheep for radio active "Strontium" (not sure of spelling). Strontium goes to the bone. It stays there for a considerable length of time.

State Health: This shouldn't bring about an immediate effect should it? It would come over a period of years wouldn't it?

Stockman: Are there other radio active materials?

AEC: Yes, but Strontium is one of the major ones. It is absorbed just as calcium is. Some others aren't so we looked for strontium. Iodine 131 goes mostly to the thyroid. This is sometimes used therapeutically. You can get enough radio active Iodine 131 to destroy the thyroid gland.

Steve Brewer: How many samples of bone did you collect from sheep that had already died.?

AEC: I only recall two. Most of the bones were from sheep who died recently rather than at the height of the effect or among the first deaths.

State Health: Couldn't we find bones from those first sheep? They would still be effected wouldn't they?

AEC: We should be able to. We'd like to be able to find more bone samples.

State Health: If we can get some who died in the middle of the effect we should.

Johnson: In the condition the sheep were (poor) do you know whether or not a small amount of radiation will keep them from coming back like they should have done. Why don't the sheep respond. There was no disease found.

AEC: We have no experimental data with sheep which would directly answer this question. We do have animals that have been kept on different levels of nutrition but we have

no evidence that radiation would keep them from responding. We d.. 't know whether we have had the same conditions as you had.

Dr. Johnson: This is an absolutely new condition. These sheep produced poor lambs that couldn't live and couldn't feed them.

: What did you find in cattle? Are they like sheep?

ABC: They should be but we haven't carried on experiments with sheep.

: What about cattle?

ABC: We have had cattle develop lesions extensively but we have no record of them dying.

: What about animals becoming sterile?

ABC: Cattle have all produced a normal calf crop.

: These cattle that had burns, were they consuming radio active plants.

ABC: Yes they collected samples and kept track. They have had no report of any death. Even had a cow that got into the cloud and it didn't die.

: In the sheep you tested only two which were dead, the rest were killed experimentally. One sheep was brought in that had bled internally. Could it have been trumped?

ABC: I don't know, I would have to check. It was one of sheep.

: There were no particular bruises but it didn't look like it had been trumped. I was interested in that one. I want to see what that was.

ABC: Did it have lesions?

: Yes.

ABC: The worst looking sheep I saw had a really scabby back all over. I think that was number 5.

: It didn't die, you killed it.

: Have to go to Commissioner's meeting.

ABC: We would like to go out and find some of these old bones.

: I won't be back until around five or six.

ABC: That's alright. Some one else will know where to find some.

State Health: Are there any herds that you know of that weren't recorded on this map?

: , ,

The herd was by Modena. Just south of the road. herd came in March 15. in same area.

ABC: sheep showed radio activity comparable to those that had been in Nevada.

: I had some two-year old ewes in good condition and they just went to pieces. We fed them corn, hay, grain. They didn't recover

the latter part of March. Would be 1 after the 20th.

State Health: Dates of these people are too confused to count anything on.

Present at the meeting were:

P. B. Pearson, Washington D. C., Chief of Biology Branch, Division of Biology, AEC.

..., Cedar City
Cedar City, Utah
, Cedar City, Utah
, D. V. A.
, Cedar City
, Cedar City, Utah
Verne Salisbury, Chief of Public Information AEC, Washington Office.
Max E. Robinson, BAE
, Cedar
Dee A. Broadbent, USAC,
and Livestockman.
, Cedar
George Spendlove, Utah State Department of Health
Dr. W. T. Hoffman
James G. Terrill, Dr., Jr. - USPHS, Washington D. C.
Seth R. Woodruff Jr. AEC, Las Vegas, Nevada.
, Cedar
Joe B. Sanders, AEC, Las Vegas
Stephen Brower, County Agent, Cedar

Statement by . of Cedar City, taken August 25, 19 8 p.m.

I run 500 ewes. I run with and . We run in the Dry Lake area 30 miles north and west of Pioche, Nevada. I used shed lambing. Normally I get 110% lamb crop. This year it was 70%. They were young ewes and had abnormally high death losses. We usually start lambing the first of May. This year I brought a few in in February and March. Some of the bigger lambs. The lambs I brought in were coming yearlings and they were sick. They were brought in the first of March. They died. I noticed the scabby burned appearance on these first yearlings. The main herd came in the 21st of April, I trailed them in. I fed no supplementary feed on the range. The range feed appearred good in the fall and water was adequate. I had a lot of deformed and premature lambs. There are still a number of sheep now that are in poor condition and are not responding to good mountain feed. I fed hay and concentrates all during lambing. I put the few who weren't responding on extra good pasture by themselves and they are still in poor condition. Losses came all during lambing. Sheep wouldn't settle down, wouldn't respond to feed, wouldn't claim their lambs. Twenty-five or twenty-seven ewes died during lambing, out of about 500. The most I have ever lost before has been from 4 to 5 or 6 head.

I kept 160 old ewes in Cedar Valley and fed them on native feed and fed hay and concentrates during lambing, and lambed them in April. I never lost a one.

Report by , September 9, 1953

1. We normally go into Nevada on November 1, and leave April -.
2. We left the area April 18, 1953
3. We first noticed abnormal losses April 20, 1953.
4. Lesions were first noticed April 27.
5. Our heaviest losses were from May 1, to May 20.

I run 1380 head of sheep.

1. The normal expected loss per year is about 7%
2. Losses in 1953 ran about 20% in the ewes. I don't know the summer losses yet.
3. Normal lamb crop is 90%.
4. Lamb crop in 1953 was about 40%.
5. Normal number of ewes we expect to loose during lambing is 40 head.
6. Ewe losses in 1953 during lambing was 180 head.

Report by , September 9, 1953

1. We normally go in Nevada on November 1, and leave about April 15.
2. Left the area April 18, 1953.
3. First noticed abnormal losses about April 20, 1953.
4. First noticed lesions April 27.
5. The heaviest losses were from May 1 to May 20.

I run 1500 head of sheep.

1. Normal expected losses per year is about 35 sheep. Usually during lambing.
2. Losses in 1953 were 250 head. Don't know about summer losses yet.
3. Normal lamb crop is 90%.
1953 lamb crop was about 40% on the ewes that were left.
5. Normally expect to loose about 35 ewes during lambing.
6. This year lost 250 head of ewes during lambing.

Statement from _____ on his sheep operation. Sep: r 9, 1953

We normally leave here the middle of October and get to Nevada about the first of November and stay there until the 15th of April and then come back in here and go to the lambing grounds this side of New Castle and then from there on to Cedar Mountain. Trailing out and back. That is the practice we followed this year. The range didn't look bad this year it was pretty close to normal. We had plenty of country to range on. We went over it all.

This year we started feeding on the 7th of April. Feeding pellets with cotton cake and bone meal. Other years we don't figure on feeding out there. We did feed a little last year. The sheep didn't seem to thrive a bit better after we started feeding them.

We went from Hamblin Valley around into Shoshone and into Lake Valley to highway 93 north of Pioche.

Our heaviest losses were from May 1 to May 20, during lambing. Started loosing some about the 20th of April. We trucked the sick ones in and a lot of them didn't ever get up after they were loaded. We always haul water all the time. They were watered every day. There was quite a lot less snow than normal this year.

We noticed the blister-like bumps on their ears and noses. We didn't examine them closely. When we sheared there were spots on some parts of their body. Just looked like the woon had come off and left a bare burn. The wool was loose and you could just take a handful and pull it off. The wool would push in front of the shears instead of cutting. The shearers noticed it and asked about it.

Lambs were so undersized they just couldn't live. They were extremely small. They were weak and even with hand feeding and dextros they didn't survive.

I had seven two-year old ewes in a pen. They were right on the hay stack and had plenty of pellets and water and they just kept getting thinner and thinner until they just died. Normal death losses are among the oldest ewes. Seemed to be the younger sheep that were dying.

The sheep that went on the mountain that did live took a long time to begin to thrive. Some still aren't. I don't think there is any scar tissue left.

I had heavier summer losses than usual and have had exceptionally good feed this year.

(_____, who was present during this statement said that he runs with _____ and that this statement would cover his operation also since they do things the same and together.)

Statement by given on October 29, 1953, at the Extension Office.

We take 2500 head of sheep to Nevada from here in about the first of November and winter there until about the first of April, then leave and trail in. We trail in to our lambing grounds north of Cedar and spend approximately two months there and then go on to the summer range south of Cedar until the middle of October and then bring them off and stay two weeks west of Cedar.

We keep 1000 head of sheep on the Escalante Desert through the winter and the rest of the operation is the same as with the other 2500 head. This is exactly the same as we have done it in the past, and as we did it last year.

We run in Lincoln County, 40 to 50 miles west of Panaca. The small herd of sheep in the Escalante Desert are two miles west of New Castle.

We lost about 850 head of ewes between the first of April and the 15th of October. We figured about 675 over and above the normal loss. We lost 2242 head of lambs between the 10th of April and the 15th of October—about 2000 over and above normal losses. All of these sheep except approximately 150 were lost during lambing time. That is between the First of April and the First of June.

We fed ½ a pound of cotton seed cake through the winter until 30 days before lambing, and then we fed a ¼ of a pound of cotton cake and ¼ of a pound of corn, and then during lambing we fed a ½ pound of corn.

Statement by , given on October 29, 1953, at the Extension Office.

We went on to the winter range on November 1. I rent my sheep out. Last year they were in with the herd. We didn't feed supplementary feed. We came off on April 20. I put on 1075 head and we've got 833 head this fall. The heavest losses came from about April on through until June. We only got about 50% as many lambs as we generally get and then we had so many born dead.

We didn't know about the effect until they came in from the herd and told us. The range was in good condition and we hauled water to the herd.

Statement of

Three of us go out together— , and . In the combined herd there were 2562 head of sheep. Our ope: was normal with no variation between 1952-3 and year previous. We hauled water to our sheep and watered them each day, which is our custom. We fed grain pellets from March 10 to April 15.

We go into the area in Nevada about November 1 and usually leave there from the 25th of April to the first of May. The date we left this year was April 30.

Abnormal losses were first noticed through April until May 10. The lesions, as far as I know, we first noted around April 15. I am not absolutely sure about the date because the herders told us about them.

Heaviest losses occurred from April 10 to May 10. During the for-part of lambing.

We, and , usually loose around 60 to 75 head of sheep during the winter. In 1953 we lost 423 head. Our normal lamb crop is usually 1100 to 1200 lambs, and this year we had 507. Usually we loose about 15 head of ewes during lambing, and this year we lost about 40.

We began lambing operations May 5. We fed good alfalfa hay and grain pellets during lambing. We lambed in sheds.

owned 762 head of the sheep in the herd.

We usually sell between 800 and 900 lambs in the fall and this year we sold 368.

Our summer losses in our growing sheep were probably 15 to 20 percent heavier than usual.

We run about 25 miles west of Panaca in Dry Lake Valley.

Chief, Bureau of State Services
Attention: Chief, Radiological Health Branch
Division of Engineering Resources
Thru: 1) Chief, Epidemiology Branch
2) Medical Officer in Charge, CDC
Chief, Veterinary Public Health Section

Sept. 4, 1953

Final Report on Sheep Disease Investigation at Cedar City, Utah - by M. A. Holmes, Veterinarian, CDC.

In reply to Mr. James G. Terrill, Jr.'s memorandum of August 21 requesting a copy of this report, we are submitting it to your office for his attention. This is the only report we have inasmuch as we instructed Dr. Holmes to prepare only one copy for submission to this office, with no distribution to persons other than the State Health Officer of Utah. We understand that Mr. Terrill in cooperation with Dr. Paul Pearson, Division of Biology and Medicine, Atomic Energy Commission, Washington, D. C. will prepare a summary report for the persons that have requested copies.

James H. Steele

Enclosures

CC: Dr. Monroe A. Holmes
CDCA
Salt Lake City, Utah

ER:RH

September 9, 1953

Dr. Arthur H. Wolff
Radiological Health Training Section
Environmental Health Center
Public Health Service
1014 Broadway
Cincinnati, Ohio

Dear Art:

I am enclosing a copy of Monroe Holmes' report which was reproduced on the Autostat. Only one copy came to us and Jim Steele told me it would be difficult to get additional copies. If Monroe forwards a copy to you, it would be appreciated if you would return this copy as we have several requests for additional copies.

I will follow through on liaison arrangements with Paul Pearson. Initially, this will consist of determining which projects they are going ahead with and perhaps an exchange of correspondence between us and the Atomic Energy Commission.

We are looking into the matter of obtaining a copy of "Radiation as a Cause of Cancer".

Sincerely yours,

(Sgd) James G. Terrill, Jr.

James G. Terrill, Jr.
Acting Chief, Radiological Health Branch
Division of Engineering Resources

CC: Dr. M. A. Holmes, CDC, Utah St. Dept. of Health
Reg. Dir., Attn: Reg. Med. Dir. PHS, Reg. IX
Dr. Paul Pearson, AEC
Dr. James Steele, CDC

September 21, 1953

Dr. Arthur H. Wolff,
Radiological Health Training Section,
Environmental Health Center,
Public Health Service,
1014 Broadway,
Cincinnati, Ohio.

Dear Art:-

I am sorry I am unable to send you my complete report as I had promised, but I see by a copy of a letter sent to you by Jim Terrill that you have probably already received it.

A letter from the County Agent in Cedar City indicated there are some continued abnormal losses in the same herds on Summer pasture. I have discussed this with Doctor Spendlove and, if Jim Steele agrees to foot some of the aditional expenses, it may be advisable that we observe these sheep on Summer range. Time is limited as the sheep will be returned soon to the home ranches for transfer to the Winter range.

If you feel you would like to be in on such continued investigation, please let me know and perhaps get in touch with Jim Steele for whatever arrangements that may be necessary for you. I am writing Jim today to obtain his views on the matter and will keep in touch with you from time to time if it is decided that it may not be necessary for you to return to Utah.

With best regards,

MAH:uml

UNITED STATES
ATOMIC ENERGY COMMISSION

P.O. Box 2088
Las Vegas, Nevada

In reply refer to:
Symbol NE

Dr. Monroe A. Holmes
U.S. Public Health Service
Salt Lake City, Utah

Dear Monroe:

Your letter dated September 24, 1953 sent to Albuquerque was not received in Las Vegas until this morning - consequently, some delay.

Regarding trips to Ely, since the meeting in Salt Lake City I have made two trips to Ely, one with Dr. Jim Terrill, the other with Bernie Trum and O'Harra. O'Harra is DVM, University of Nevada. The enclosed copies of correspondence and report contain a list of contacts made and results of investigations.

Steve Brower's report on continued deaths and unthriftiness of sheep at Cedar City is new to me. Talked with last Monday who reported sheep in carload lots leaving Cedar City daily, but did not mention losses. The Oak Ridge people, Dr. John Rust and B. F. Trum are going to follow some few sheep and cattle to slaughter pens and obtain additional tissues and bones for laboratory tests.

I will get comments on continuing sheep losses when I talk to him today or tomorrow. Please let me know what Steve Brower reports to you and, if, in your opinion, the condition warrants further investigations.

Thanks for your letter and interest. Sorry about the delay, but I live in the wicked city of Las Vegas, Nevada.

Very truly yours,

/s/ Joe B. Sanders
Deputy Field Manager
Las Vegas Field Office

Enclosures:
1. U. of Tenn. AEC Report dtd 9-7-53
2. Cy memo to Pearson dtd 8-24-53

Microscopic Examination

Ovine	F	7 yr	651
Specie	Sex	Age	Necropsy Number

THE RESPIRATORY SYSTEM

No apparent change

THE CIRCULATORY SYSTEM

Pericardium - Some lymphocytic exudate in pericardial fat.

Epicardium

Myocardium - Sarcosporidia. Numerous granlomatous foci between muscle bundles and involving Purkinje fibers as well as vascular structures. Some tissue loss.
Endocardium (Purkinje fibers and valves) - Not unique except as above.

Arteries, veins and lymphatics

THE HEMOPOIETIC CENTERS

Lymph nodes - Active production of lymphocytes.

Spleen - Numerous active germinal centers. Fixed and free macrophages containing brown pigments.

Bone marrow

THE DIGESTIVE SYSTEM

No apparent change, except

Liver and gall bladder - Numerous small granulomatous foci distributed about the parenchyma and vascular structures with some parenchymal destruction.

the ENDOCRINE GLANDS (except ovary and testis)

No apparent change

THE URINARY AND REPRODUCTIVE SYSTEMS

Kidneys - Not unique except for a rare small interstitial granulomatous reaction.

Ureters

Urinary bladder - Not unique

Urethra

Genitalia (external)

Uterus and cervix - inactive (regressional stage)

Ovary or testis - All stages of cogenesis and luteinization are present.

Accessory glands and ducts

Mammary glands

THE SKELETAL SYSTEM

No apparent change

THE MUSCULAR SYSTEM

Smooth muscle

Straited muscle (except cardiac) - Sarcosporidia and some very small foci between muscle bundles, of a granulomatous nature. There may be a slight loss of muscle tissue.

THE NERVOUS SYSTEM

Cerebrum and olfactory bulb - Some lymphocytic foci and some privascular cupping with glial cells. Neuronophagia prominent.

Cerebellum

Brain stem

Spinal cord - Not unique

Peripheral nerves and ganglia

Other structures (including touch, pressure, heat, cold, pain and proprioceptive receptors)

THE SENSORY RECEPTORS SYSTEMS (Except olfactory)

No apparent change

THE SKIN AND ACCESSORY STRUCTURES

Skin - There is an ulceration of the skin with a neutrophilic exudate.
(Mouth) - The cornified layer has been largely lost. The granular layer is thick. The papilla of the dermis are long and give an insular appearance. A marked and extensive granulomatous process is taking place in the dermis involving all structures, ie., hair, follicles, glands and muscle bundles.

OTHER STRUCTURES AND TISSUES

No apparent change

PATHOLOGIC DIAGNOSIS

1. Granulomatous dermatitis of the lips and face with accompanying ulceration and granulomatous lesions of the cerebrum, liver, heart, kidney and striated muscles, cause unknown but suspected to be of viral nature.

John H. Rust
Pathologist

LT. Col. V. C. U. S. Army.

HISTORY: Sheep, property of Mr. [redacted] c[redacted]ly, Nevada, were grazing on slopes of Mount Wheeler during the month of May. The lambing season started 8 May 1953 and was of 45 days duration. All sheep were in good flesh. Grazing conditions were not bad.

About 1 May 1953, a disease appeared in the flock. Old and young ewes, black or white faced alike were susceptible. Lambs 2 days to two weeks old became affected. Losses were estimated at 25% of the flock. Losses appeared to have decreased until few cases were present on or after July 1st.

SYMPTOMS: The principle symptom was ulceration of the muzzle and lips. Lambs were said to have had masses of proliferating tissues protruding from mucosa of cheeks and lips. Occasionally lesions were found in the interdigital clefts and the ears became thickened, droopy and ulcerous. The animals became inappetant and inanimate, older sheep gradually weakening until death whereas young lambs would lie down with their heads between the front legs and die without struggle. No temperatures were taken nor were autopsies performed during this time.

INVESTIGATION: On 19 August 1953 a seven year old ewe, said to be typical of others having had the disease, was sacrificed and a necropsy performed.

Before slaughter she appeared to be in good flesh, temperature of 102.2^0 F with ulcers of the mouth and muzzle. The lesions were thickly crusted necrotic areas with more or less continuity from one corner of the mouth to the other across the muzzle. The buccal membrane was not involved. When scabs were removed an area of bleeding proliferating tissues was revealed. Wool, skin, brain, hypophysis, thyroid, lung, muscle, bone, liver, spleen, kidney, ovaries, lymph glands and bladder were sectioned for microscopic examination as well as detection of radioactivity. No gross pathologic changes

were observed excepting a pus filled lymph glanc . . ne lesions described above from the mouth.

PATHOLOGY: A definitive examination has not been made but a preliminary perusal of tissue sections failed to reveal pathogentic changes excepting the lesions around the mouth. Here a necrosis of the dermis, cellular degeneration of the Malpighian layer and irregularity of cell grouping together with presence of large numbers of bacteria, predominently of a actinomycotic type were noted.

BACTERIOLOGY: A mixed bacterial culture was grown from aseptically collected skin, consisting of streptococci, staphylococci and actinomyces, not yet identified.

Sufficient time has not elapsed to evaluate animal inoculations made from blood and tissues.

RADIOACTIVITY: On the basis of two hour counting of wool and soft tissue samples, no radioactivity could be detected above background except in the case of the thyroid which counted 3.7 ± 1.16 counts per minute above background for 1.5 grams of tissue. This is considered biologically insignificant and could still be attributed to error of sampling (Background count 87.6 c/m - thyroid 91.3 c/m (1.5 gm). No further analysis to be done except in bone which surveyed negative.

CONCLUSIONS: On the basis of concluded examinations and epizoology the sacrificed ewe was suffering from ulcerative stomatitis of an infectious type with bacterial invasion of tissue. No radioactivity could be detected in the wool, skin or tissues.

AGRICULTURAL EXPERIMENT STATION

UNIVERSITY OF NEVADA

RENO, NEVADA

DEPARTMENT OF VETERINARY SCIENCE

September 5, 1953

Lt. Col. Bernard F. Trum, VC
UT-AEC Agricultural Research Program
P. O. Box 142
Oak Ridge, Tennessee

* * * * * Your letter of August 28 regarding the sheep received. After looking over the report and reviewing the autopsy and history, I do agree with your diagnosis that this is probably an atypical outbreak of infectious stomatitis. I will be going to Ely on Tuesday of this next week and will contact Mr. and report our findings to him at that time. * * * *

Very truly yours,

/s/ John

John L. O'Harra, D.V.M.

JLO:sa

OFFICE MEMORANDUM - UNITED STATES GOVERNMENT

To: Paul H. Pearson, Division of Biology & Medicine : Aug 24 1953
USAEC, Washington, D. C.
From: Joe B. Sanders, Acting Field Manager, Las Vegas Field Office

SUBject: INVESTIGATION OF LIVESTOCK CONDITIONS, ELY - EUREKA AREAS

SYMBOL: NE

As stated in your memorandum dated August 13, 1953, Dr. Terrill and I located several sheepmen on August 12-13, 1953 who grazed sheep west of Highway No. 6 to determine if any of the sheepmen experienced conditions comparable to those reported by some of the Cedar City wool growers. A report of the contacts made is as follows:

Frank Morrow, County Agent
Had not learned of similar difficulties. Gave us names and locations of sheepmen to contact.

, Owner, , Ely, Nevada
Buys sheep and wool. Had not learned of abnormal sheep losses in vicinity.

, Sheepman
Has ranch located east and north of Eureka . Had no trouble with sheep that ranged within 20 miles of his house, except during storm occurring around middle of May when he almost lost all of his yearlings, but by hard work and long hours managed to save most of them. has good grass and lots of water on his ranch. He is ready to sell lambs but buyer hasn't been around. Must sell within two weeks.

, Sheep and Cattleman
Ranch is located , west and north of Eureka. Winter range for sheep - Warm Springs Willow Creek area. Did not see Mr. . Mrs. reported losses attributed to halogeton which is found around home range and also on winter range. The are confident halogeton caused heavier than normal losses.

, Sheepman
Ranch located near Highway 50, east of Eureka. Range sheep on south side of highway, east of ranch house. No trouble with sheep. Some loss from eating halogeton, but no heavier than normal.

John Kirk, Manager, Bureau of Land Management Office, Ely, Nevada
Had not heard of unusually high losses in sheep. Some halogeton in area. Mr. Kirk gave us location of grazing areas covered by permits issued from his office.

Paul H. Pearson Aug 24 1953

_____, Sheepman
is a brother of Iron County, Utah. trouble is comparable to that experienced by Utah stockmen. His grazing allotments are close to his brother's and other Utah stockmen. He reports scabs on sheep, sore faces and noses. Fed corn all winter. Unable to improve condition of sheep by supplemental feeding. Mr. thinks range land appeared to be in fair condition, but grasses did not contain normal food value. Lost 10% of ewes. Lambing very poor, dry ewes, etc. Trailed sheep a distance of 35 miles. Hauled water to sheep in tank wagon. Mr. did not mention radiation as contributing to death of his sheep.

Mr. was in Reno while we were conducting survey. contacted Mr. who reported they run eleven herds of approximately 1700 sheep in each herd. All herds run on comparable ranch areas. Only one herd affected. The affected herd ranged on east slope of Wheeler Mountain. Ewe losses in this herd of 1700 approximated 500. Lambing very poor, 65% of normal. Sheep on winter range, Timber Mountain - Coyote Creek area, approximately 80 miles northwest of Pioche, in general vicinity of ranges used by and . Moved sheep from winter range to Wheeler Mountain area March 1-10, 1953, a distance of approximately 185 miles. Started lambing May 1, 1953. Heavy loss during lambing. Reported good grass on winter range. Black sheep affected same as others. Report sore nostrils and mouths, badly swollen mouths. Some sheep would not eat, others would eat, but died anyway.

On August 19, 1953 Bernard S. Trum, John S. O'Harra and the writer visited one of the ranches located south of Ely. There we saw two of the afflicted sheep. The sheep looked to be in good condition except for sores, scabs and puss in and around nostrils. We killed one 6 or 7 year old ewe and recovered wool, blood and tissues which Trum took to Oak Ridge. Also bones were recovered from sheep that died in May 1953. These will be sent to Trum early during the week of August 23-29. Trum thinks the sheep killed had ulcerative stomatitis.

At Ely on August 19, 1953, Mr. and Mr. reported that they received very heavy fall-out from one shot and that Mr. , Mr. and Mr. sustained minor facial burns that extended up under their hats and had terrific headaches that lasted two and one-half days from fallout radiation. Mr. reports having seen the jet planes overhead tracking the cloud and that the Forest Rangers reported heavy fallout in the area, particularly at Murphy's Canyon. Mr. could not recall the date of fallout nor did he know whether or not the Forest Rangers had radiac meters to check radiation intensities. We told Mr. that our experts have assured us that this sort of thing can't happen. Mr. said that all the men affected got rid of their headaches the second day after the shot and, to the best of his knowledge, they have enjoyed good health since. The cloud from Shot No. 2 traveled over to the Wheeler Mountain area.

UNITED STATES
ATOMIC ENERGY COMMISSION
P. O. Box 2088
LAS VEGAS, NEVADA

IN REPLY REFER TO:
Symbol NE

Dr. Monroe A. Holmes
U. S. Public Health Service
Salt Lake City, Utah

Dear Monroe:

Your letter dated September 24, 1953 sent to Albuquerque was not received in Las Vegas until this morning - consequently, some delay.

Regarding trips to Ely, since the meeting in Salt Lake City I have made two trips to Ely, one with Dr. Jim Terrill, the other with Bernie Trum and O'Harra. O'Harra is DVM, University of Nevada. The enclosed copies of correspondence and report contain a list of contacts made and results of investigations.

Steve Brower's report on continued deaths and unthriftiness of sheep at Cedar City is new to me. Talked with last Monday who reported sheep in carload lots leaving Cedar City daily, but did not mention losses. The Oak Ridge people, Dr. John Rust and B. F. Trum are going to follow some few sheep and cattle to slaughter pens and obtain additional tissues and bones for laboratory tests.

I will get comments on continuing sheep losses when I talk to him today or tomorrow. Please let me know what Steve Brower reports to you and, if, in your opinion, the condition warrants further investigations.

Thanks for your letter and interest. Sorry about the delay, but I live in the wicked city of Las Vegas, Nevada.

Very truly yours,

Joe B. Sanders
Deputy Field Manager
Las Vegas Field Office

Enclosures:
1. U. of Tenn. AEC Report dtd 9-7-53
2. Cy memo to Pearson dtd 8-24-53

172

172-183

UNITED STATES
ATOMIC ENERGY COMMISSION
NEVADA TEST SITE
P. O. BOX 2088
LAS VEGAS, NEVADA

IN REPLY REFER TO:
Symbol NE

Dr. Monroe A. Holmes
U. S. Public Health Service
Salt Lake City, Utah

Dear Monroe:

Your letter dated September 24, 1953 sent to Albuquerque was not received in Las Vegas until this morning - consequently, some delay.

Regarding trips to Ely, since the meeting in Salt Lake City I have made two trips to Ely, one with Dr. Jim Terrill, the other with Bernie Trum and O'Harra. O'Harra is DVM, University of Nevada. The enclosed copies of correspondence and report contain a list of contacts made and results of investigations.

Steve Brower's report on continued deaths and unthriftiness of sheep at Cedar City is new to me. Talked with last Monday who reported sheep in carload lots leaving Cedar City daily, but did not mention losses. The Oak Ridge people, Dr. John Rust and B. F. Trum are going to follow some few sheep and cattle to slaughter pens and obtain additional tissues and bones for laboratory tests.

I will get comments on continuing sheep losses when I talk to him today or tomorrow. Please let me know what Steve Brower reports to you and, if, in your opinion, the condition warrants further investigations.

Thanks for your letter and interest. Sorry about the delay, but I live in the wicked city of Las Vegas, Nevada.

Very truly yours,

Joe B. Sanders
Deputy Field Manager
Las Vegas Field Office

Enclosures:
1. U. of Tenn. AEC Report dtd 9-7-53
2. Cy memo to Pearson dtd 8-24-53

THE UNIVERSITY OF TENNESSEE

ATOMIC ENERGY COMMISSION

AGRICULTURAL RESEARCH PROGRAM

ADDRESS:

DATE 9/7/53

Project Special for AEC

Contributor's Number 651

Contributor Trum

Species Ovine Breed ? Age 7 yr Sex F Color ?

Abstract of clinical history or experimental procedure

See attached protocol

Description of gross pathologic changes (include anatomic situations)

Remarks: (including reference to literature if report of case has been published)

Diagnosis: (Use reverse side for additional remarks)

See Attached report.

171

Directions for fixing and mailing specimens: Blocks of tissue not more than 0.5 cm. thick, or whole organs that have been opened or incised, should be well fixed in 10% formalin. They may be forwarded wrapped in cloths wet with the fixative in a box, carton or tin can. Small blocks of tissue should be placed in a wide-mouthed bottle filled with the fixative. Photographs and X-ray films should be forwarded when pertinent. These will be copied and returned.

Microscopic Examination

Ovine	F	7 yr	651
Specie	Sex	Age	Necropsy Number

THE RESPIRATORY SYSTEM

Nares and pharynx (including eustachian tube and diver ticula)

Larynx

Trachea

Bronchus and bronchioles

Lung - Not unique

Circulatory apparatus

THE CIRCULATORY SYSTEM

Pericardium - Some lymphocytic exudate in pericardial fat.

Epicardium

Myocardium - Sarcosporidia. Numerous granlomatous foci between muscle bundles and involving Purkinje fibers as well as vascular structures. Some tissue loss.
Endocardium (Purkinje fibers and valves) - Not unique except as above.

Arteries, veins and lymphatics

THE HEMOPOIETIC CENTERS

Lymph nodes - Active production of lymphocytes.

Spleen - Numerous active germinal centers. Fixed and free macrophages containing brown pigments.

Bone marrow

THE DIGESTIVE SYSTEM

Mouth (including lips, tongue and buccal mucosa)

Esophagus

Stomach

Duodenum

Jejunum

Ileum

Cecum

Colon

Rectum and anus

651
Necropsy Number

THE DIGESTIVE SYSTEM (continued)

Liver and gall bladder - Numerous small granulomatous foci distributed about the parenchyma and vascular structures with some parenchymal destruction.

Pancreas

Salivary glands

Other tissues and glands

THE ENDOCRINE GLANDS (except ovary and testis)

Adrenals

Hypophysis cerebri - Not unique.

Epiphysis cerebri

Thyroid - Not unique.

Parathyroid

Islets of Langerhan

Thymus

THE URINARY AND REPRODUCTIVE SYSTEMS

Kidneys - Not unique except for a rare small interstitial granulomatous reaction.

Ureters

Urinary bladder - Not unique.

Urethra

Genitalia (external)

Uterus and cervix - inactive (regressional stage)

Ovary or testis - All stages of cogenesis and luteinization are present.

Accessory glands and ducts

Mammary glands

THE SKELETAL SYSTEM

Joints

Cartilage

Epiphyseal plate

Metaphysis and epiphysis

Shaft bone (compact)

Necropsy Number 60

THE MUSCULAR SYSTEM

Smooth muscle

Straited muscle (except cardiac) - Sarcosporidia and some very small foci between muscle bundles, ~~&~~ of a granulomatous nature. There may be a slight loss of muscle tiss

THE NERVOUS SYSTEM

Cerebrum and olfactory bulb - Some lymphocytic foci and some privascular cupping with glial cells. Neuronophagia prominent.

~~Cerebellum~~

Brain stem

Spinal cord - Not unique.

Peripheral nerves and ganglia

Other structures (including touch, pressure, heat, cold, pain and proprioceptive receptors)

THE SENSORY RECEPTORS SYSTEMS (Except olfactory)

Eye and adnexa

Ear and adnexa

THE SKIN AND ACCESSORY STRUCTURES

Skin - There is an ulceration of the skin with a neutrophilic exudate.

(Mouth) - The cornified layer has been largely lost. The granular layer is thick. Th

~~Hair, wool, feathers or horn~~ (papilla of the dermis are long and give an insular

(appearance. A marked and extensive granulomatous proce

Glands (is taking place in the dermis involving all structures

(is., hair, follicles, glands and muscle bundles.

OTHER STRUCTURES AND TISSUES

PATHOLOGIC DIAGNOSIS

1. Granulomatous dermatitis of the lips and face with accompanying ulceration and granulomatous lesions of the cerebrum, liver, heart, kidney and striated muscles, cause unknown but suspected to be of viral nature.

17

~~Pathologist~~

Lt. Col. V. C. U. S. Army.

HISTORY: Sheep, property of of Ely, Nevada, were grazing on slopes of Mount Wheeler during the month of May. The lambing season started 8 May 1953 and was of 45 days duration. All sheep were in good flesh. Grazing conditions were not bad.

About 1 May 1953, a disease appeared in the flock. Old and young ewes, black or white faced alike were susceptible. Lambs 2 days to two weeks old became affected. Losses were estimated at 25% of the flock. Losses appeared to have decreased until few cases were present on or after July 1st.

SYMPTOMS: The principle symptom was ulceration of the muzzle and lips. Lambs were said to have had masses of proliferating tissues protruding from mucosa of cheeks and lips. Occasionally lesions were found in the interdigital clefts and the ears became thickened, droopy and ulcerous. The animals became inappetant and inanimate, older sheep gradually weakening until death whereas young lambs would lie down with their heads between the front legs and die without struggle. No temperatures were taken nor were autopsies performed during this time.

INVESTIGATION: On 19 August 1953 a seven year old ewe, said to be typical of others having had the disease, was sacrificed and a necropsy performed.

Before slaughter she appeared to be in good flesh, temperature of 102.2° F with ulcers of the mouth and muzzle. The lesions were thickly crusted necrotic areas with more or less continuity from one corner of the mouth to the other across the muzzle. The buccal membrane was not involved. When scabs were removed an area of bleeding

proliferating tissues was revealed. Wool, skin, brain, hypophysis, thyroid, lung, muscle, bone, liver, spleen, kidney, ovaries, lymph glands and bladder were sectioned for microscopic examination as well as detection of radioactivity. No gross pathologic changes were observed excepting a pus filled lymph gland and the lesions described above from the mouth.

PATHOLOGY: A definitive examination has not been made but a preliminary perusal of tissue sections failed to reveal pathogenetic changes excepting the lesions around the mouth. Here a necrosis of the dermis, cellular degeneration of the Malpighian layer and irregularity of cell grouping together with presence of large numbers of bacteria, predominantly of a actinomycotic type were noted.

BACTERIOLOGY: A mixed bacterial culture was grown from aseptically collected skin, consisting of streptococci, staphylococci and actinomyces, not yet identified.

Sufficient time has not elapsed to evaluate animal inoculations made from blood and tissues.

RADIOACTIVITY: On the basis of two hour counting of wool and soft tissue samples, no radioactivity could be detected above background except in the case of the thyroid which counted 3.7 ± 1.16 counts per minute above background for 1.5 grams of tissue. This is considered biologically insignificant and could still be attributed to error of sampling (Background count 87.6 c/m - thyroid 91.3 c/m (1.5 gm)). No further analysis to be done except in bone which surveyed negative.

CONCLUSIONS; On the basis of concluded examinations and epizoology the sacrificed ewe was suffering from ulcerative stomatitis of an infectious type with bacterial invasion of tissue. No radioactivity could be detected in the wool, skin or tissues.

676

AGRICULTURAL EXPERIMENT STATION

UNIVERSITY OF NEVADA

RENO, NEVADA

DEPARTMENT OF VETERINARY SCIENCE

September 5, 1953

Lt. Col. Bernard F. Trum, VC
UT-AEC Agricultural Research Program
P. O. Box 142
Oak Ridge, Tennessee

* * * * * Your letter of August 28 regarding the sheep received. After looking over the report and reviewing the autopsy and history, I do agree with your diagnosis that this is probably an atypical outbreak of infectious stomatitis. I will be going to Ely on Tuesday of this next week and will contact Mr. and report our findings to him at that time. * * * *

Very truly yours,

S/ John

JLO:sa

John L. O'Harra, D.V.M.

STANDARD FORM NO. 64

COPY

Office Memorandum • UNITED STATES GOVERNMENT

TO : Paul H. Pearson, Division of Biology & Medicine, USAEC, Washington, D. C. DATE: Aug 24 1953

FROM : Joe B. Sanders, Acting Field Manager, Las Vegas Field Office

SUBJECT: INVESTIGATION OF LIVESTOCK CONDITIONS, ELY - EUREKA AREAS

SYMBOL: NE

As stated in your memorandum dated August 13, 1953, Dr. Terrill and I located several sheepmen on August 12-13, 1953 who grazed sheep west of Highway No. 6 to determine if any of the sheepmen experienced conditions comparable to those reported by some of the Cedar City wool growers. A report of the contacts made is as follows:

Frank Morrow, County Agent
Had not learned of similar difficulties. Gave us names and locations of sheepmen to contact.

Ely, Nevada
Buys sheep and wool. Had not learned of abnormal sheep losses in vicinity.

, Sheeman
Has ranch located east and north of Eureka . Had no trouble with sheep that ranged within 20 miles of his house, except during storm occurring around middle of May when he almost lost all of his yearlings, but by hard work and long hours managed to save most of them. has good grass and lots of water on his ranch. He is ready to sell lambs but buyer hasn't been around. Must sell within two weeks.

, Sheep and Cattleman
Ranch is located west and north of Eureka. Winter range for sheep - Warm Springs Willow Creek area. Did not see Mr. . Mrs. reported losses attributed to halogeton which is found around home range and also on winter range. The are confident halogeton caused heavier than normal losses.

, Sheepman
Ranch located near Highway 50, 13 miles east of Eureka. Range sheep on south side of highway, east of ranch house. No trouble with sheep. Some loss from eating halogeton, but no heavier than normal.

COPY

John Kirk, Manager, Bureau of Land Management Office, Ely, Nevada
Had not heard of unusually high losses in sheep. Some halogeton in area. Mr. Kirk gave us location of grazing areas covered by permits issued from his office.

, Sheepman
is a brother of
Utah. trouble is comparable to that experienced by Utah stockmen. His grazing allotments are close to his brother's and other Utah stockmen. He reports scabs on sheep, sore faces and noses. Fed corn all winter. Unable to improve condition of sheep by supplemental feeding. Mr. thinks range land appeared to be in fair condition, but grasses did not contain normal food value. Lost 10% of ewes. Lambing very poor, dry ewes, etc. Trailed sheep a distance of 35 miles. Hauled water to sheep in tank wagon. Mr. did not mention radiation as contributing to death of his sheep.

, Manager
Mr. was in Reno while we were conducting survey. John S. O'Harra contacted Mr. who reported they run eleven herds of approximately 1700 sheep in each herd. All herds run on comparable ranch areas. Only one herd affected. The affected herd ranged on east slope of Wheeler Mountain. Ewe losses in this herd of 1700 approximated 500. Lambing very poor, 65% of normal. Sheep on winter range, Timber Mountain - Coyote Creek area, approximately 80 miles northwest of Pioche, in general vicinity of ranges used by Moved sheep from winter range to Wheeler Mountain area March 1-10, 1953, a distance of approximately 185 miles. Started lambing May 1, 1953. Heavy loss during lambing. Reported good grass on winter range. Black sheep affected same as others. Report sore nostrils and mouths, badly swollen mouths. Some sheep would not eat, others would eat, but died anyway.

On August 19, 1953 Bernard S. Trum, John S. O'Harra and the writer visited one of the ranches located south of Ely. There we saw two of the afflicted sheep. The sheep looked to be in good condition except for sores, scabs and puss in and around nostrils. We killed one 6 or 7 year old ewe and recovered wool, blood and tissues which Trum took to Oak Ridge. Also bones were recovered from sheep that died in May 1953. These will be sent to Trum early during the week of August 23-29. Trum thinks the sheep killed had ulcerative stomatitis.

At Ely on August 19, 1953, Mr. and Mr. reported that they received very heavy fall-out from one shot and

that Mr. , Mr. nd Mr. sustained minor facial burns that extended up under their hats and had terrific headaches that lasted two and one-half days from fallout radiation. Mr. reports having seen the jet planes overhead tracking the cloud and that the Forest Rangers reported heavy fallout in the area, particularly at Murphy's Canyon. Mr. could not recall the date of fallout nor did he know whether or not the Forest Rangers had radiac meters to check radiation intensities. We told Mr. that our experts have assured us that this sort of thing can't happen. Mr. said that all the men affected got rid of their headaches the second day after the shot and, to the best of his knowledge, they have enjoyed good health since. The cloud from Shot No. 2 traveled over to the Wheeler Mountain area.

September 21, 1953

Mr. Stephen L. Brower,
County Agricultural Agent,
Cedar City, Utah.

Dear Mr. Brower:-

I have recently returned from my vacation and your letter of August 28th had been forwarded to my office for consideration. I notice that Doctor Spendlove, in answer to your letter, asked if it was possible to obtain the actual losses of sheep in numbers and percentages of those that are now on Summer range in the mountains. If this data Doctor Spendlove has requested, plus that you might have obtained from individual sheep men, have been obtained I would appreciate it if you would forward them to me as quickly as possible in order that we may plan any investigation that may be indicated.

As you possibly know, the Agricultural College in Logan has been involved in the sheep death and are planning experimental work as well as study of sheep that have been affected. On our last trip to Cedar City the major portion of the apparently unaffected sheep had been transferred to the mountains and we were unable to see any actual symptoms that had been given us by the sheep men. It would aid immeasurably to observe these sheep if the condition is still present.

Post-mortem examinations, as well as clinical observations, will be necessary and such work, to do it correctly, needs planning and preparation. At the present time I have tentatively made arrangements to return to Cedar City, possibly accompanied by some of our own agricultural veterinarians as well as representatives of the Atomic Energy Commission. If you have contacted these people regarding this problem and they have arranged with you to see these sheep, I would appreciate such information so that we all may be able to co-ordinate our activities.

At the present time we are unable to provide you with copies of our reports on the data that we had obtained in Cedar City. This information has been classified by the Public Health Service and the Atomic Energy Commission and will be released as a summary report through these organizations at a later date. Your office has been listed as one of the agencies to receive this report.

Thanking you for any information you may be able to send and for your continued interest in this problem, I am

Sincerely yours,

M. A. HOLMES
Public Health Veterinarian
Disease Control Section

MAH:unl

184

COOPERATIVE EXTENSION WORK

IN

AGRICULTURE AND HOME ECONOMICS

STATE OF UTAH
CEDAR CITY

UTAH STATE AGRICULTURAL COLLEGE
U. S. DEPARTMENT OF AGRICULTURE
AND IRON COUNTY COOPERATING

August 28, 1953

EXTENSION SERVICE
County Agent and
Home Demonstration Agent
Work

Dr. Holmes
Public Health Service
Salt Lake City, Utah

Dear Dr. Holmes:

Regarding the abnormal losses of sheep among Cedar City sheepmen who run in Nevada during the winter, recent reports have come to my office that there is some indication of continued abnormal loss in these herds even on lush pastures on the mountain, and a generally unthriftiness among some of these sheep. I have written to Dr. Spendlove mentioning this situation and asked his opinion as to whether he thought it would be adviseable for some additional investigation to be made while the sheep run on the mountain.

Some of the information which you collected from individual stockmen when you were here earlier this year was, of necessity, approximations. Since that time more accurate information is available, particularly, in terms of the number of death losses among the herds and lambing percentages this year as compared to other years, etc. The individual sheepmen have agreed to submit this information to my office in the near future and it may be of some value to you to bring your records up-to-date.

I would appreciate obtaining copies of the reports or summaries of the information which you accumulated while you were here. Also any other reports which are available with regard to this situation.

Sincerely

Stephen L. Brower
County Agri. Agent

SLB:sf

185

September 2, 1953

Mr. Stephen L. Brower
County Extension Agent
Cedar City, Utah

Dear Mr. Brower:

We are pleased to receive your letter and the current information about sheep losses in southern Utah. Any additional information that you might be able to supply will be appreciated. We don't wish to put you to extra work in obtaining it, but if the surveys are going to be made which will provide actual losses in numbers and percentages, we feel this information would be of value.

This office has not received a summary of the work and will probably receive only one summary after conclusions have been reached. Any such summary will be made available.

Yours for better health,

George A. Spendlove, M.D.
Director of Public Health
130 State Capitol Building

GS/j

cc: Dr. Holmes via Dr. Jenkins

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

PUBLIC HEALTH SERVICE

ATLANTA 5, GEORGIA

IN REPLYING, ADDRESS THE
OFFICER IN CHARGE
COMMUNICABLE DISEASE CENTER
50 SEVENTH STREET, N.E.

October 12, 1953

Dr. G. A. Spendlove
State Health Commissioner
State Dept. of Health
Salt Lake City, Utah Attention: ~~Dr. Monroe~~ Holmes, Veterinarian

Dear Dr. Spendlove:

In reply to your letter of September 21, I discussed this with Mr. James Terrell, Acting Chief, Radiological Division. Mr. Terrell suggested that you do an immediate survey to determine what the size of the problem may be. I concur with this and recommend that you make a survey and send a report directly to Mr. Terrell with a copy to this office.

In regard to obtaining additional copies of your report, I suggest that you also take this up with Mr. Terrell inasmuch as I no longer have your copy in this office. I sent him your report shortly after it was received.

I am happy to note that the Utah veterinary public health program has been approved by the State Board of Health. We would appreciate a copy for our files. I hope that I will have an opportunity to visit you this winter.

Best wishes.

Sincerely yours,

James H. Steele

James H. Steele, Chief
Veterinary Public Health

Public Health Servi--

Chief, Division of Engineering Resources October 13, 1953
Attention: Acting Chief, Radiological Health Branch

Assistant Chief, Radiological Health Training Section

Utah Sheep

I have received from Dr. Holmes some additional information regarding the Utah sheep situation. I assume that you also have received copies of this data. If not, please notify me and I will have additional copies made for your information.

The data concerns some additional follow-up conducted by Doctors John Rust and B. F. Trum. Their investigations involved in particular the managed by Mr. Dr. Rust submitted a report on the necropsy of an animal that was sacrificed on August 19, 1953. I have no comment to make about the histopathology involved; however, I would like to comment on the statements made on "Radioactivity" and "Conclusions". Dr. Rust points out in regard to radioactivity that

> "On the basis of two hour counting of wool and soft tissue samples, no radioactivity could be detected above background except in the case of the thyroid which counted 3.7 / 1.16 counts per minute above background for 1.5 grams of tissue. This is considered biologically insignificant and could still be attributed to error of sampling (Background count 87.6 c/m - thyroid 91.3 c/m (1.5 gm). No further analysis to be done except in bone which surveyed negative."

and he further states in his conclusions:

> "On the basis of concluded examinations and epizoology the sacrificed ewe was suffering from ulcerative stomatitis of an infectious type with bacterial invasion of tissue. No radioactivity could be detected in the wool, skin or tissues."

Based on the sketchy information in this report it appears that herd was probably exposed to a single fall out, that associated with shot No. 2. If we can assume that this was the sole exposure received by his herd then I am not in accord with Dr. Rust's intimation that this radiation data is "biologically insignificant". Apparently, this data was collected sometime after August 20, 1953. If we can assume that the activity in the thyroid gland is due to the March 24 shot then over nineteen half lives had passed prior to counting. Extrapolating this data back to March 26, 1953, it would appear there was over one microcurie per gram of iodine 131 fixed in the thyroid gland initially. Although this concentration admittedly cannot be

considered deleterious to the thyroid gland, it is pr... ive evidence again of appreciable exposure to gross fission products. Incidentally it is in the order of the concentrations found in the Cedar City animals.

I have not submitted my comments to Dr. Rust or Dr. Trum. Would you advise that I correspond with them concerning this difference of opinion.

ARTHUR H. WOLFF

cc: Dr. Holmes

AHW:mf

THE UNIVERSITY OF TENNESSEE

ATOMIC ENERGY COMMISSION

Holmes

RESTRICTED

AGRICULTURAL RESEARCH PROGRAM

ADDRESS:

VETERINARY NECROPSY PROTOCOL*

PROJECT Special AEC DATE 10-14-53

CONTRIBUTOR Rust-Trum

IDENTIFICATION

Species	Other applicable identification (Owner's name, color, identifying mark, tag number)	Sex / Age
Ovine	?	Female 6 mo.
None	#6	696
Hours intervening between death and autopsy		Necropsy Number

CLINICAL DIAGNOSES: None

NECROPSY DIAGNOSES: None

CLINICAL ABSTRACT

This animal was a "doggie" lamb born the past spring in Cedar City (Utah) Valley. Neither it nor its mother had been out of the area or near any major atomic detonation fall out.

190

*See suggestions outlined in Veterinary Post Mortem Procedures, published by the Army Institute of Pathology, 1947.

GROSS FINDINGS*

GENERAL: (Weight, condition of cadaver, hair coat, body orifices, scars, wounds, superficial tumors, etc.)

PRIMARY INCISION: (Subcutaneous fat, muscles, peritoneum, position of viscera, body lymph nodes, etc.)

Visceral and maxillary lymph nodes moderately swollen and grayish-pink on cut surface.

RESPIRATORY SYSTEM: (Larynx trachea, bronchi, lymph nodes, lung, pleura.)

HEART: (Pericardium, epicardium, myocardium, endocardium, valves, coronary vessels.)

AORTA, BLOOD & LYMPH VESSELS:

SPLEEN:

Not unique.

*If additional space is required under any particular heading, continue where space is available or append additional sheets.