STATE VETERINARY SURGEON
REPORT OF THE

TWENTY-THIRD
ANNUAL MEETING

of the

United States
Live Stock Sanitary
Association

CHICAGO
December 1, 2 and 3
1919
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REPORT OF THE PROCEEDINGS
of
Twenty-third Annual Meeting of the United States Live Stock Sanitary Association

Chicago, December 1, 2, 3, 1919

The meeting was called to order December 1, 1919, at 10 o'clock a. m., at the Hotel LaSalle, Chicago, by President George W. Dunphy.

PRESIDENT DUNPHY: Gentlemen, you know we have been coming here year after year, and have been welcomed by someone from the executive office of the city of Chicago, and they have never intimated to us that there was any place between the Detroit River and the Mississippi River but Chicago. You know, Chicago people think it is this only place in the world. They tell about a gentleman from Chicago, a prominent citizen, who passed to the great beyond, and when the guide had showed him around for about an hour, he said to the guide: "I have heard this place Heaven recommended very highly time and again, but I cannot see that it is a bit different from Chicago." And the guide said: "Heaven? This isn't Heaven."

We have discovered that outside of the city of Chicago, there is a great big powerful state, a state noted for fertile farms and the very highest grade of good live stock, a state noted for a lot of live manufacturing cities, town and villages, and above all things, we recollect that this state has given us two great presidents. We understand now that they are ready to offer us a third, and as you listen to the genial welcome of the chief executive of this state this morning, I hope you will make up your minds that we will be ready to accept Illinois' third offering.

I take great pleasure in introducing to you Hon. Frank O. Lowden, governor of the great state of Illinois.

ADDRESS OF WELCOME
By Gov. Frank O. Lowden

We are always glad to welcome representatives of your great industry to Illinois, and especially during the week of the International, because we believe that the International Live Stock Exposition is the greatest exhibit of its kind in all the world. I have been a charter member of that Exposition. I recall that
a few years ago when the World's Fair was on at St. Louis, I had to elect whether I should go to the World's Fair at St. Louis or attend the annual International here, because I had not time for both, and it did not take me a moment to elect in favor of the International.

Its influence during the twenty years of its existence has been felt in every corner of this country, and has reached the remotest parts, and therefore I am very glad this morning to meet this very representative body of men who care for the health of our farm animals, together with the breeders of those animals.

I am not here this morning so much in my capacity as governor, as a breeder of farm live stock. As you scientific gentlemen know, we are under the necessity of treating with the very greatest consideration you gentlemen who represent the sanitary end. Sometimes we disagree with you, sometimes we think that the regulations that you enforce have not been worked out with that practical care which is necessary if the great breeders' industry is to continue to flourish in this country. While that is true, we admit that the services you are rendering to the industry as a whole, and therefore to the country as a whole, are beyond calculation.

Take the one subject of tuberculosis alone, because the white plague is no less terrifying in the farm lot than in the individual's home, and in the few years in which you have been at work combating this great plague, you really have accomplished the almost impossible, and today we can look into the future with a reasonable hope that that plague will one day be exterminated, and the value not only to the industry, but to the country as a whole, will be beyond calculation, when this is accomplished.

There probably was never a time in the history of our country when so heavy a burden was laid upon the live stock breeder as today, because the countries of Europe have been pretty well depleted of their live stock, at least, some of the most important of them, and our own production is hardly sufficient for our own needs, and therefore every energy must be employed if the live stock breeders and producers of America are to meet the demands which increasingly will be laid upon them in the ensuing year.

I have often said that a breeder had not lived up to his full opportunity until he had persuaded every farmer within the radius of his influence that he could not afford to use any-
thing but a pure-bred sire upon his farm, because if there is
one thing which you can make clear to the most ordinary mind,
it is that the pure-bred sire will pay for himself in shorter time
and realize larger dividends than any other live investment the
farmer can make. It is simply the measure of our ability to set
the facts clearly before the farmer. And yet there is only a
small percentage of the farms of America that do not pursue
the old wasteful extravagant method of using scrub sires.

In the war which recently came to a close, the world saw
as it never saw before, that after all agriculture is the basic in-
dustry of any land. We learned during that time that no nation
was secure that did not have the means within its own borders
to feed itself. We saw that danger and fear stalked about the
land that was not so favorably situated.

Our own strength consists largely in the fact that so far we
have been able to feed ourselves. And yet before the war be-
gan, the most thoughtful of our people saw that our exports of
farm products were constantly decreasing; that it was only a
question of time when America would have no surplus beyond
her own needs; and still within a hundred years we have seen
most of our best arable lands in the United States brought
under cultivation.

The conclusion from all this is that without better methods
of agriculture, and especially without better methods in the
live stock industry, America will soon reach the point where
she is not able to feed herself. It does not require a prophet
to foresee this, so that at the present time our best hope for
the future, not only of our own great industry, but of the coun-
try, is in an improved agriculture. We must more and more
consider that no agriculture is successful which is not so con-
ducted as to maintain permanently the fertility of the soil. and
I do not know—and I have traveled somewhat, and have studied
agricultural conditions in other countries—I do not know how
you are going to do this practically unless the tilling of the soil
and the raising of live stock go along hand in hand.

So it is with very great pleasure that I welcome you here
this morning. I wish I might remain and participate in your
discussions. I have glanced over your program enough to know
that it will be a very great contribution to these problems that
I have only hinted at. Maybe before you go I shall have the
pleasure of meeting you down at the International, because un-
less some new domestic war arises—and we cannot always fore-
see this—I am going down myself and forget my present cares,
and only remember the happy days when I was there in the capacity of an exhibitor, and not as the chief magistrate of any state.

President Dunphy: I now take great pleasure in calling on Mr. D. A. Wallace, editor of "The Farmer," published in the state of Minnesota, to reply to this cordial address of welcome from the governor.

RESPONSE TO ADDRESS OF WELCOME

By D. A. Wallace, St. Paul, Minn.

I deem it a very great honor and a privilege to respond to this splendid address of Governor Lowden's. For a long time we people in the Northwest, and no doubt the people in the states that you gentlemen reside in, have heard with the greatest interest the statements that Governor Lowden has made regarding agriculture. We have admired the understanding of the situation which Governor Lowden has shown in his addresses.

All over this country just at the present time, we are awakening to the fact that agriculture, as the governor says, is our basic industry. We are beginning to understand that we must have a redirection of our national thought, which will take into consideration the fundamental importance of agriculture, and the necessity for developing our agriculture resources. I am sure that I voice the sentiment of you gentlemen, and the sentiment of the farmers of the West, that the time is near at hand when the agricultural voice of the West must have an expression in the presidential chair.

It was just two weeks ago that I attended a very remarkable meeting in this same room and in the room adjoining, a meeting which brought together delegates from the farm bureau organizations of some thirty states; in fact, there were representations from practically all of the agricultural states of the nation. These earnest farmers—and they were actual farmers—had gathered together for the first time in the history of the country to perfect a national organization of farm people, an organization starting at the very bottom, which would be controlled entirely by farm people. The sentiments expressed at that convention almost exactly echoed the statements that Governor Lowden has made this morning.

Just at this time when the entire nation is disturbed by industrial unrest and radicalism, the viewpoint of the thinking farmers of the West is exceedingly important. The farmer,
probably the only unorganized class in the United States, being both a capitalist and a laboring man, constitutes the balance of power and the balance wheel for this country at the present time. It is exceedingly important that the American farmer continue to show his sturdy Americanism, and his ability to think steadily and rightly during these months of national trouble.

If you could have attended that meeting in this hotel two weeks ago, I am sure you would have discovered that the thinking farmers of the United States are maintaining their equilibrium, and will continue to act wisely during the weeks and months to come, and will save this country until normal conditions are again restored.

The meeting which was held in this hotel is significant of an awakening which is going on all over this country—the awakening of farm people to the necessity of formulating a national program for agriculture; a program that will place agriculture in its right relation to our other great industries.

Within a period of years probably represented by the age of most of those in the audience, we have opened up for cultivation all of this vast western country, western Illinois, Iowa, Nebraska, Kansas, Minnesota, North and South Dakota, Montana, probably the largest area of the best land to be found in the entire world. This great section has been opened up within the past fifty years, and has given to the United States the largest and the cheapest supply of food that was ever known in the world. Because of this cheap food we have built up such cities as Chicago, and other great manufacturing centers, all over the United States, on the belief that through cheap food these cities could continue to expand and grow.

As a result of this condition of affairs, we have grown lop-sided in our national viewpoint toward agriculture, and as the governor so strikingly stated, we are just beginning to find out that a cheap food supply in this country is a thing of the past, and we must look forward to some new arrangement whereby we can so safeguard the interest of agriculture and give a square deal to the farmer, so that we will continue to make farm life so attractive that our farm labor will not be drawn to the more favored occupations. Therefore, I say that we will have to begin to formulate a national program for agricultural development.

The time is at hand when the business men of this country must realize that agriculture is our basic industry. The farm
people of this country are coming to realize that they must join the ranks of the organized classes in this country, and secure for themselves the rights and privileges which their industry entitles them to.

I am exceedingly glad to have this opportunity of assuring Governor Lowden that his presence is very heartily appreciated at this meeting.

I would be somewhat remiss in my duty if I did not at this time say just a word of tribute to one of my very dear friends, and a dear friend to everyone in the room. I refer to Dr. S. H. Ward, whose death occurred just after the meeting of the United States Live Stock Sanitary Association here in Chicago a year ago. My last words with Dr. Ward were in the anteroom, and I suggested to him that he was so sick he ought to go home. He told me—he could hardly talk—that his duty was here at this meeting, and I feel certain that his attention to that duty was one of the causes of his death.

Those of us in Minnesota who were close to Dr. Ward understand the wonderful direction which his work gave to live stock sanitary work all over this country and abroad. Coming to Minnesota when we first inaugurated our State Live Stock Sanitary Association, Dr. Ward took charge of that work, which, by the way, was among the first sanitary work carried on in the United States, and it was due to the broadness of his vision, the great understanding which he had of the work, that Minnesota was able to assume leadership in the live stock sanitary work among the states, to be followed by the other states of the middle west, eventually laying the foundation for this splendid organization.

Not only in this country but in Canada, Dr. Ward established their meat inspection service, and was instrumental in shaping their early policies in live stock sanitary work, and I want at this time just to express what I believe is a proper word of tribute for that very dear friend who left us a year ago.

President Dunphy: Gentlemen, I am sure you will feel that you have been paid for being on hand promptly this morning to hear the very cordial address of welcome from the governor, and the very earnest and able response from Mr. Wallace.

We will now proceed with the general program, which consists first in the reading of the minutes of the previous meeting.

Secretary Campbell: Mr. President, in accordance with custom, I merely wish to present the published report of the last meeting, which contains our minutes, and I presume that it is not necessary to take up the time to read them.
A motion to that effect prevailed.

**PRESIDENT DUNPHY:** The next upon our program, I find, is the reading of the President's address, this, owing to the large and I hope interesting program that we have, will be short. Some of the matters that I have touched on in this address have been presented to you by Governor Lowden and Mr. Wallace, so I am proud to call your attention to the fact that "great minds run in the same direction." 

**PRESIDENT'S ADDRESS**


It affords me a great deal of pleasure to meet you, and greet you, on this occasion. It has been twenty-three years since this organization was formed, and it has grown from a comparatively few members to the largest organization of its kind in the world. The advantage of an institution of this kind (made up, as it is, of sanitarians, live-stock breeders, and others interested in the production of meat and dairy products) is that all these elements contributing to the welfare of this great industry meet on common ground, each willing to contribute his share in the work of advancing the best interests of the whole organization.

We have an opportunity here of discussing matters pertaining to the successful breeding, feeding, and marketing of meat and dairy animals, having in mind the most important sanitary measures for the safety of these animals from time of birth through all stages of growth and preparation for the market, or to serve in the dairy or on the breeding farms or in the production of wool for clothing.

Although the development of our live-stock interests in the past has been something wonderful, I believe we have even a greater future before us. The great World War through which we have just passed has left many of the live-stock producing nations almost stranded in regard to this industry, and it will no doubt devolve upon us to not only supply these people with meat and dairy products, but also to aid in replenishing their flocks and herds.

It is up to the interests represented here today to stand shoulder to shoulder in pushing along this enterprise to its utmost limit. The breeder must see to it that we produce a greater number of animals, with form and finish that we may be proud of, and the veterinarian and sanitarian must see that these ani-
mals are free from and protected against infectious and communicable diseases, so that the expression "Bred in America" may mean to the other countries of the world "good breeding, good form, and freedom from disease."

In this way, all the elements that go to make up this great association will do their part and no doubt will get the credit due them in building up a reputation for this America of ours as the greatest live stock country in the world.

We can readily see that the very interests blended together in this organization make it a potential factor in the successful development of the live stock problems that confront us. As our live stock interests grow and develop, new problems will arise that will naturally tend to demand attention and excite interest, and there is no other body of men or organization so well qualified to meet these conditions. Made up as we are of all the interests that enter into the successful handling of this great industry, the country will naturally look to us to guide it through any emergency that would have a tendency to cripple the live stock industry of the state or nation.

We have here the scientific and practical forces combined in this organization, and the closer the alliance between the two forces the greater our influence will be for the betterment of the sanitary conditions of our live stock and, by united effort, for protecting the health and enhancing the wealth of the nation. I am glad to be able to advise you that we are having a very substantial increase in our membership, which will no doubt have a tendency to increase our influence in the affairs of the nation.

I am pleased to report the result of the work of our committee of last year that was appointed to visit our Congress in Washington in an endeavor to get the salaries of the employees of the Bureau of Animal Industry increased to meet with increased living expenses. Here was a body of trained sanitarians, connected with the government of the richest country in the world, greater in live stock resources and the production of food than any other country on the globe, working at salaries that were scarcely sufficient for a bare living.

This association passed a resolution asking its president to appoint a committee to go to Washington and interview members of Congress in regard to increasing these salaries. This committee proceeded to Washington, as requested, and while they did not meet with as good results as we desired, I am pleased to say that they succeeded in getting an increase in
these salaries, and I sincerely hope that this association, before it adjourns, may make another effort in behalf of these competent and efficient men who are employed by the bureau.

Another important proposition that should engage our attention is an endeavor to get the sanitary rules and regulations of the different states on a uniform basis. If each state would adopt the same regulations in regard to the transportation of live stock and its entry into the state, we would avoid a great deal of the confusion among shippers and greatly facilitate the movement of live stock. We could take for a basis the regulations of the Bureau of Animal Industry and work out a more uniform plan of interstate shipment.

Another matter that should challenge our attention is the closer inspection of feeder cattle that are purchased from the stockyards and shipped out to the farms. Many of these animals develop hemorrhagic septicemia a few days after leaving the yards and cause considerable loss to the purchasers. I believe a closer inspection of these animals and disinfection of the yards would eliminate a considerable amount of this loss.

There are other problems that might profitably engage our attention at this meeting, notably the closer attention to feeder sheep in regard to scab. This disease has caused our own state of Michigan a great deal of annoyance and considerable loss, owing to sheep afflicted with scab being shipped from the yards and placed on some of our ranches in the cut-over lands.

However, I do not deem it advisable to take up the time of the convention in dwelling on these details, but hope in your discussions and deliberations that you may endeavor to construct plans to eliminate some of these menaces to the breeding and feeding industry.

I cannot close this address without calling to your attention the calamity which befell this association in the loss of our beloved and efficient secretary, Dr. S. H. Ward, of St. Paul, Minnesota, one of the most earnest and useful workers of this organization, and I hope that our committee which has these matters in charge will present a suitable resolution in regard to our great loss.

I will not take up any more of your valuable time, but trust you will enter into the spirit of this work and make this meeting both interesting and instructive.

PRESIDENT DUNPHY: The next on our program is the report of the Executive Committee, by John H. McNeil of New Jersey, Chief of the Bureau of Animal Industry of that state.
TWENTY-THIRD ANNUAL REPORT

Dr. McNeil: Mr. Chairman, the committee has no formal report to offer. The material presented was very thoroughly gone over at a meeting yesterday, and the secretary and the chairmen of the Resolutions and Credentials Committees were asked to report on the matters which pertained to the material presented to us for action. Therefore, the report of the committee will come when the secretary makes his report, or his recommendations, and the chairmen of the respective committees.

President Dunphy: The next matter on the program is the report of the Secretary-Treasurer, Dr. D. M. Campbell.

Secretary Campbell: Mr. President, that part of the report referred to by Dr. McNeil, will not be ready until this afternoon. It has to do with applications for membership, and not all of them have been vouched for, so that will come up at the opening of the meeting this afternoon.

With the publication of the annual report and the president's address, there does not seem much left for the secretary to report upon, but I have written down a few things that have occurred to me here with reference to the association, and I will take this opportunity to present them.

SECRETARY'S REPORT

Being a sort of ad interim secretary and having served this association in the capacity only a few months, it may seem presumptuous for me to offer suggestions for extended or marked changes in the activities or policies of an association so long established, so uniformly successful and of so great achievements as this one. Nevertheless, I shall make the following observations growing out of my short experience in the office of secretary and leave it to the good judgment of those who have long guided the destinies of the United States Live Stock Sanitary Association with such conspicuous success. to reject those things that in the light of their greater experience are impractical or of doubtful propriety and if desirable adopt and carry out any that possess real value, if there be any such.

Membership

This association has been in existence for a period of more than twenty years, yet its membership has reached but little more than four hundred. With the consent of the President, I have made some effort to procure new members, chiefly among veterinarians, and have asked a number of state veterinarians to send me lists of desirable membership material. Those whose names were submitted were solicited for membership. The result is applications totalling in number nearly 50 per cent of our present membership were received. It shows
that membership in this association is very attractive to veterinarians. It appears that properly presented, it should be equally attractive to the breeders desirous of getting upon the list of those having tuberculosis free accredited herds in particular, and to many other breeders and shippers of live stock, and to transportation companies, stockyard officials, packers and perhaps others.

Your president has said this association should have 10,000 members. I will refrain from expressing an opinion on this. A membership of 2,000 would, in my opinion, make feasible putting into effect any or all of the suggestions made in this report. With the co-operation of our present members, it could be attained easily.

**Policies**

The association has the appearance of being too strongly veterinary. To serve its purpose best, it must never be dominated by veterinarians, the Bureau of Animal Industry, the regulatory forces, the breeders, or any other one interest. To avoid even the appearance of a prepondering influence by one element, I believe the constitution should be altered to make it impossible. The present elective officers, all seven of whom are veterinarians, show what may happen without such restrictions even when no combine was actual or intended.

I have been surprised to learn the extent to which the office of secretary of this association is considered by the members to be sort of a bureau of miscellaneous information. It appears that this office should possess at all times a complete and up-to-date list of state live stock commissioners, state veterinarians, members of state veterinary examining boards and veterinarians authorized to do inspection for interstate shipment of animals, with their addresses. Also the regulations for interstate shipment of live stock and the salient provisions of all state veterinary practice laws. All of this information is available elsewhere; but not all members know where, and they write the secretary for it.

**A Tribunal for Correction of Abuses**

This association has more than once been the common ground upon which regulatory officers, the breeders and those engaged in research work have come together in the solution of problems that could not have been solved except for this co-opera-
I think there may be an even greater demand for such a mediator in the near future. As announced before this association a year ago, it is the present plan to turn the sanitary supervision of the tuberculosis free accredited herds over to practicing veterinarians after they have been under official supervision for two years. This is fraught with very great concern to the whole accredited herd plan. In the not distant future, there will probably be more than a thousand and possibly several thousand private practitioners doing official work of a most important and exacting kind. It goes without saying that in the main, the practitioners will acquit themselves creditably and to the satisfaction of those in charge of the plan; but it is too much to hope that in selecting this large number of veterinarians, as they must be selected, that all will be efficient, competent and otherwise equipped in personality, experience and diplomacy for a task so exacting. A plan should be worked out in this association for handling this matter that will be fair to the owners of the herds, the officials of the state and federal governments and to the veterinary profession. It is better that such a plan be worked out here than for it to be handed down from the top or shoved up from the bottom. Although these men may be regularly appointed as government officers and paid a dollar a year if that be necessary to fix responsibility and rendered amenable to the same rules and laws that govern a regular employee of the bureau, I feel sure that there will be controversies and charges of misconduct arise that can be handled to greater advantage by a neutral and impartial tribunal than they can by official action, and certainly no other organization is in a position to represent all interested parties.

Bureau of Live Stock Sanitation

There should be in this country some central agency for the collection and prompt publication of statistical matter having to do with live stock sanitation. The Bureau of Animal Industry's reports of the progress in tick eradication, and on the accredited herd plan and on meat and serum inspection offer data on isolated and detached problems of disease control, but a service vastly more comprehensive is greatly needed, a general statistical service that will furnish a constantly available gauge of the disease situation throughout the whole country. The movement for such a service should be started at once by this association. This service might be best established within the Bureau of Animal Industry, but there appear to the
writer many advantages in having it entirely unofficial and an enterprise of this association.

**Publicity**

There can be no question as to the advisability of immediate steps to establish closer relations between this association and existing publications of the livestock industry and of the veterinary profession. Our meetings should attract editors of all livestock and most general farm publications, who should be furnished every facility for obtaining material presented at our meetings immediately upon its presentation. The association's influence can be extended incalculably by such measures.

Chicago, December 1, 1919.

D. M. Campbell,
Secretary.

**TREASURER'S REPORT.**

I have made the treasurer's report up in two sections; first, the receipts and expenditures of the clerical secretary before I took charge of the office; and second, receipts and expenditures since July 1st.

In the first section of the report, receipts are as follows:

Balance on Hand, November 30, 1918 $977.66
Advertising $474.00
Dues, 1916 1.00
Dues, 1917 4.00
Dues, 1918 35.00
Dues, 1919 187.00
20th Annual Reports 4.00
21st Annual Reports 11.00
22nd Annual Reports 339.00

$1,055.00 $2,032.66

Expenses, $1,234.03. Balance on hand, November 15, 1919, $798.03.

In the second part of the report, receipts are as follows:
190 New applications for Membership $570.00
Dues, 1918 17.00
Dues, 1919 70.00
Dues, 1920 300.00

$957.00 $957.00


Accounts receivable from program advertising, $450.00.
This leaves a total balance of $1,033.83 in the treasury on December 1st, 1919, with all bills paid and accounts receivable to the amount of $450.00; being an increase in the association's balance in the treasury of more than $600 for the year. A very satisfactory showing indeed.

Attached is an itemized list of expenditures and receipted bills.

D. M. Campbell,
Treasurer.

President Dunphy: Gentlemen, you have heard the report of the Secretary-Treasurer. What is your pleasure in regard to it?

Dr. Cotton: I move it be received and referred to the Executive Committee.

Motion duly seconded, and carried.

President Dunphy: I would further state in regard to this report of the secretary-treasurer, that there are a number of suggestions made there or recommendations in regard to our constitution and by-laws, and I hope the Executive Committee will take this up at an early date, and let us put these recommendations in force as early as we can, so that before the closing day of the meeting we may have this ironed out, as it were, and we will be working then under new regulations to some extent next year when these recommendations can be put in force.

The next upon our program is the report of Committee on Legislation, by Mat. S. Cohen, of Kentucky, commissioner of agriculture of that state, who is the chairman of that committee.

Mr. Cohen: We were called to Washington by the chairman of this association, or rather, the chairman directed the chairman of the Legislative Committee to call the members of the committee to Washington. That committee consists in its personnel of Halladay, of Michigan; Way, of New York; Bayard, of Pennsylvania; Glover, of Wisconsin; Butler, of Tennessee; and Brown, of Virginia, together with the chairman. As I remember, there were only four of this committee who responded to the call.

After reaching Washington and visiting one or two of the federal departments, your committee immediately realized that it had a man's job on hand. I did not at the time, and do not now feel that the Secretary of Agriculture was really in sympathy with us. I regret it, because, gentlemen, upon your shoulders rests to a large extent the advancement of this nation. But we are not deterred. We visited first the congressman from the Union Stockyards District, Mr. Rainey, and were met with a very cordial welcome and reception. We were ably assisted by congressmen from several of the states, and especially from my native state, and to make the story short, we secured the amendment, or rather the rider offered by Mr. Rainey of Illinois, to the agricultural bill in its enactment, which provided for something like $400,000 annual increase for the representatives of the Bureau, especially the meat inspectors, which is a mere pittance to those able members of that department of our national government who have been forced and compelled to devote the better part of their lives and their energies, after having spent several years in preparation for that vocation in life, at such meager salaries.
I believe that this committee should be continued, and they should be called by its chairman, whoever he may be—my time expires in January, and of course I shall expect a new chairman—and I feel they should watch the activities of Congress very closely in the interest of the Bureau members, and if possible procure an increase of at least a million dollars additional to what we have already procured.

We also succeeded in getting a slight increase in the hog cholera appropriation, I think $447,000—it should have been a million. We had the tuberculosis propaganda appropriation increased from $500,000 to a million and a half, and I think that they in a way cracked the crust of the pudding when they set aside $500,000 of that appropriation for operations, and a million dollars for expenditures, because, as I have stated, the amount is inadequate to supply a sufficient force to properly look after that great industry.

I am going to ask if there is any other member of this Legislative Committee who has anything to add to my report, because I attended only two meetings, and I have not seen a member of the committee since. Since then I have undergone an ordeal the effect of which it will perhaps take me years to outlive and overcome, but be that as it may, I regret for more reasons than one that I will not be in a position to continue in my meager way in my efforts to promote and advance the great industry represented by this organization. I hope that in the selection of the chairman of your future Legislative Committee you will use the discretion that was suggested by the colored member of the Methodist church in Kentucky to his pastor during this last fall.

In Kentucky at a negro Methodist revival, the minister, Brother Johnson, was caught behind the door with his arm around one of the sisters. This very much incensed the better element of the congregation, and they immediately appointed a committee to wait on Brother Johnson, to ask him to explain why he had resorted to such tactics. The committee immediately waited on Brother Johnson, and told him that it had been whispered around the congregation that he was guilty of some impropriety, and asked him for an explanation. Brother Johnson said: "I guess you all don't know very much about the scriptures. The scriptures provide that the pastor of the church shall be the shepherd of his flock, and that flock consists of both sheep and lambs. The scriptures further provide that the shepherd shall show some feeling, some brotherly love, some spirit toward his members, both the sheep and the lambs." The committee looked at each other, and finally Rastus said: "Brother Johnson, we must admit that we were not well advised on the scriptures. We further agree with you in your explanation, but, Brother Johnson, let me suggest, as the chairman of this committee, that in the future when the shepherd wants to bestow some affection upon the members of his flock, both the sheep and the lambs, that he pick out a ram-lamb."

President Dunphy: Gentlemen, we should be well satisfied with what the committee has accomplished in the last year. They have made an entering wedge, and I believe that a committee following this up will get still greater results. I am more than pleased with my selection of last year's committee, especially the chairman, and I regret that the chairman of this committee has informed us that he cannot continue further in the work, because I believe we had the right man in the right place. However, I hope whoever succeeds me in the chair will use care
in selecting the committee, and I believe it would be advisable to select some of the committee that were associated with Mr. Cohen in his work last year before Congress at Washington. I sincerely hope that at least several of that committee will continue, because they will be better posted on how to get at the work, and as I stated before, I very much regret that Mr. Cohen has informed us that he cannot continue. I would be almost in favor of trying to force him into the job, because under his leadership that committee did accomplish something against great obstacles.

A motion that the report be accepted was carried.

President Dunphy: I am informed by the secretary that there is no report from the Committee on Publication, consequently we will pass that over for the president.

The next matter to be taken up is the report of the Committee on Grievances. Are there any grievances, or any report of that committee? The secretary informs me that the chairman of that committee says that there are no grievances before his committee, but if anyone has a kick coming they can report it to the committee at any time.

The next is the report of the Committee on Tick Eradication. The chairman is E. Pegram Flower, secretary and executive officer of the Live Stock Sanitary Board of Louisiana.

REPORT OF COMMITTEE ON TICK ERADICATION

By E. Pegram Flower, Baton Rouge, La.

I think, Mr. Chairman, the undisputed statement can be made that this United States Live Stock Sanitary Association was primarily organized for the purpose of eradicating the Texas fever tick. This organization however, has so materially increased in membership that other live stock sanitary problems which, in the opinion of the association, have apparently become more important than consideration of the tick eradication part of the program and the interest originally displayed is disappearing in the same ratio as the rapid elimination of this pest from the southern territory so infected.

This report covers the entire scope of tick eradication during the season of 1919 up to December 1, embracing marked activities in this systematic progressive and important work to the inclusion of ten states. Mississippi and South Carolina have been included in this report, although previously released from quarantine due to checking up or completion work necessitating a certain amount of systematic dipping.

Alabama operated during the season 8,070 dipping vats and dipped 6,174,817 head of cattle. There were 12,574 square miles of infested territory released December 1, there still remains in quarantine 19 per cent of the state. Funds expended, federal, state and county, $982,134 for tick eradication.
Arkansas operated during the season 3,900 dipping vats and dipped 5,200,000 cattle. There were 6,757 square miles of infested territory released December 1, there still remains in quarantine 20 per cent of the state. Funds expended, federal, state and county, $305,000 for tick eradication.

Georgia operated during the season 2,603 dipping vats and dipped 3,395,000 cattle. There were 7,700 square miles released December 1, still remaining in quarantine 20,006 square miles or 36 per cent of originally infested territory. Funds expended, federal, state and county, $308,500 for tick eradication.

Florida, although progressing favorably, has really only been making preparations for intensive tick eradication during 1920. During the season of 1919, 1,422 dipping vats were in operation in which were dipped 1,842,236 head of cattle. There were no territories ready for release this year, therefore with the exception of 9,645 square miles previously released there still remains in quarantine 82 per cent of the state. Funds expended for tick eradication jointly, of federal, state and county, $254,620.

Louisiana operated during the season 4,586 dipping vats wherein were dipped 10,105,294 cattle and 84,914 head of horses and mules. On December 1, there were 9,298 square miles released from quarantine making a total of 40,376 square miles released out of the original 45,409 square miles infested when work began. There still remains in quarantine, subject to completion next season, 7 per cent of the entire state. Funds expended, federal state and county, for tick eradication, 1919, $649,498.88.

Mississippi, released from quarantine 1917, operated during the season 5,153 dipping vats and dipped 3,438,486 cattle at a total cost, to federal, state and county authorities, $276,753.00.

North Carolina operated 583 dipping vats and dipped, during the season, 39,326 head of cattle. There still remains in quarantine, no additional territory being ready for release Dec. 1st, 21 per cent of the state, or 7,691 square miles. Federal, state and county funds expended $65,318.00.

Oklahoma operated during the season 1,154 dipping vats in which were dipped systematically under supervision 3,091,700 head of cattle and 20,000 head of mules and horses. There were 4,358 square miles released from quarantine Dec. 1, thus leaving in quarantine, remaining infested territory in the entire state of 19 per cent. Federal, state and county funds expended, $147,500.00 for tick eradication work.
South Carolina operated during the season 831 dipping vats in which were dipped 1,000,000 head of cattle, 500 head of horses and mules. The cost of conducting work, state and bureau funds, $93,500.00. The entire state of South Carolina was released from quarantine Dec. 1, 1918, and the work conducted this season, though rather extensive there being 16,340 square miles of territory work, being in the nature of complete eradication of possible remaining infestation.

Texas operated during the season 6,232 dipping vats in which were dipped under official supervision, every fourteen days, 14,243,370 cattle. There were recommended for release Dec. 1, 7,020 square miles, there still remaining in quarantine 114,346 square miles or 60 per cent of the infested territory. Federal, state and county funds expended for tick eradication $796,672.00.

In summarizing the results demonstrated by these reports, respecting the extensive and satisfactory progress of tick eradication in the above ten southern states, the following figures, which are as accurate as it is possible to obtain, are extremely interesting.

During the season of 1919, there were 34,534 dipping vats in constant operation in which were dipped under official supervision, at fourteen day periods, a total of 48,530,229 cattle and 453,150 horses and mules.

In order to maintain the standard strength arsenical solution for the purpose of efficiency in the process of tick eradication in charging and replenishing the 34,534 dipping vats in operation, 397,157 gallons of prepared dip were utilized and 963,591 pounds of arsenic or a grand total of approximately 1,796,621 pounds of arsenic.

In conformity with the established system of supervision of detailed work in charging vats, inspections and records of dipping the following force of inspectors were necessary during the season; B. A. I., 319; state, 542; county, 1,850, or a total of 2,711 trained men. The total amount of money expended for systematic tick eradication during the season of 1919 federal, state and county, amounted to $3,879,496.00.

Since the inception of tick eradication in 1906, at which time 728,565 square miles were infected up to Dec. 1, 1919, there have been released 509,084 square miles, or 70 per cent of the entire infected territory. The total area released during the calendar year, 1919, amounted to 50,555 square miles.
PRESIDENT DUNPHY: Gentlemen, you have heard the very able and complete report of Chairman Flower. What is your pleasure in regard to it?

Upon motion the report was referred to the Committee on Publication.

PRESIDENT DUNPHY: Gentlemen, this ends our program for the forenoon, unless someone has an announcement to make.

Dr. Gibson: I want to say to the gentlemen present that the Committee on Resolutions will be glad to receive at the earliest possible moment any proposed or prepared resolutions that the authors thereof wish to have the committee consider and present. We would like to have those who wish to have problems considered by the Resolutions Committee present those problems to the committee at an early date, so that we will have time to give them proper and serious consideration.

The convention adjourned to two o'clock P. M.

SECOND SESSION.
Monday—December 1, 1919.
Two o'clock P. M.

PRESIDENT DUNPHY: We have a session this afternoon, as you will notice by the program, on tuberculosis. The first number on our program is, "Present Status of the Live Stock Industry," by H. R. Smith, Livestock Commissioner of the Chicago Live Stock Exchange.

PRESENT STATUS OF THE LIVE STOCK INDUSTRY

By H. R. Smith, Chicago

The topic assigned me merits a comprehensive study of conditions surrounding our live stock industry—conditions which have prevailed in the past, affecting supply and demand, and conditions as they exist now. I wish I were competent to treat the subject as its importance deserves.

Probably no industry in the United States has been subjected to greater vicissitudes than has our live stock industry; there are so many circumstances often unforeseen which affect it vitally, both as to production and consumption. Beef production is frequently cut down by an unusually severe winter on the range; mutton and pork by cold, damp weather during the lambing and farrowing seasons; and dairy products by high priced labor. All kinds of live stock production is curtailed by summer drought, high priced feed and disease outbreaks. The consumption of the product is seriously affected by social and industrial conditions, both at home and to some extent by those abroad. A strike involving millions of workers, heavy meat consumers, may be called over night. With no work and with wages discontinued, meat is the first article of food to be eliminated from the table of the striker and his family.
The live stock industry in the United States has had a remarkable growth. We are comparatively young as nations go, but we had in the United States, even before the war, half as many sheep, nearly as many cattle, as many hogs and more horses than were to be found in all the nations of Europe, exclusive of Russia. We have had this remarkable development because of our large area of land, well adapted to the growing of feed for live stock. Then, too, meat has been one of our most profitable export commodities and it has been handled efficiently. Our people have shown enterprise in securing good seed stock from Europe with which to start the improvement in quality which has continued to the present date. We have been both alert and diligent in developing our herds and flocks.

No attempt will be made to review the evolution of the live stock industry in the United States. There have been some recent developments, however, that are unusual and of particular interest because of their bearing on the future of this great industry.

There has never been a period of our history in which conditions surrounding the live stock industry, as affecting both supply and demand, have so changed as during the past ten years. Forty or fifty years ago a large proportion of the cattle fattened in the Middle West were raised there. During later years a large percentage of the cattle fattened on our farms has been raised in the range states.

This system of breeding beef cattle in the West, to be later finished for market on corn belt farms, became an established custom through the rise in value of farm lands and through the development of large herds on government land where grass was available during the summer at practically no cost, and where sufficient hay could be put up to sustain the cattle during the times of heavy snows. With the development of the ranch system in the West, the farmer found that he could buy western feeding cattle at lower cost than they could be reared on his farm. The result was that herds of beef-bred cows kept on farms for raising calves disappeared almost entirely, and were later replaced, in most instances, with cows possessing more of the dairy qualities. On the higher priced corn lands of Illinois and Iowa nearly all the farms are devoted to the production of crops, with live stock operations confined largely to winter feeding.

There has occurred during recent years a most remarkable transformation. Western land formerly used for grazing pur-
poses has been converted into immense tracts, now devoted to the growing of wheat and other small grain. According to government records, 85,673,396 acres of public domain passed to private ownership during the six-year period, 1909 to 1914 inclusive, and this movement has continued until there is now but a comparatively small acreage suitable for cultivation that is not operated as farm and pasture land. Nearly all the large ranch outfits discontinued operations, resulting in a partial disorganization of an established system of cattle and sheep production in which it has been the practice to depend almost entirely upon the West as a breeding ground.

In view of this rapid settlement of western lands it is not surprising that the total number of beef cattle in the United States declined 30 per cent during the period 1907 to 1914, and that prices advanced 55 per cent. The advance in the price of beef cattle was correspondingly greater than the decline in number, because our population increased at the rate of approximately 2 per cent a year during the period mentioned. The next period of five years, January 1, 1914, to January 1, 1919, was in marked contrast. Government statistics show an increase of 24 per cent in the number of beef cattle in the United States, more than double our increase in population during that time. These estimates show that January 1, 1919, we had a total of 67,866,000 cattle of all kinds in the United States, which was only 6 per cent less than on January 1, 1907—the largest number on record. Notwithstanding this 24 per cent increase in number from January 1, 1914, to January 1, 1919—more than twice our increase in population—the price of beef cattle on the Chicago market increased 70 per cent during that period. In fact with the exception of the years 1911 and 1915, the average price per hundred of native beef steers at the Chicago market has advanced each succeeding year for the past seventeen years, as shown by the following statistics compiled by the Chicago "Drover's Journal":

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<th>Year</th>
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During the years immediately preceding the outbreak of the war in 1914, our imports of beef exceeded our exports. The heavy shipments of beef to Europe during the war was unquestionably a factor in stimulating prices at that time. How-
ever, since the signing of the armistice which not only served to cancel practically all future orders for the needs of the allied armies in Europe, but which also caused to be released numerous boats for carrying the surplus of Australian and South American beef to Europe, the price of beef still remains high. The armistice was signed more than a year ago, yet top cattle are bringing today $20.50 per hundred, equal the highest prices on record which were obtained last spring. The average price of native beef steers sold on the Chicago market during the first eleven months of 1919 was $15.55 per hundred as compared with $14.65 per hundred for the year 1918, or six per cent more.

Contrary to the forecasts of many people, the number of cattle marketed during the year 1919 has been considerably less than in 1918. During the first nine months of the present year, the decrease in the receipts of cattle at the Chicago market was 237,404 head as compared with the first nine months in 1918. There was a similar decrease at all Middle West markets, amounting to a total of nearly a million head. This would indicate that the supply of cattle in the country is much lower than last year, due to extreme drought in the Northwest and in other sections of the West. The beef cattle nursery of the United States has been seriously depleted. Notwithstanding the great decline in our beef export trade, the outlook is favorable for high prices in the immediate future. Our home demand for the product is, of course, the large factor in maintaining high prices. So long as labor is well employed and wages are high, there will be a good demand for meat. While the price on this article of diet seems high to the consumer, it is not out of proportion with many other staple foods. Our whole scale of prices has advanced during recent years, and it is not unreasonable to think that there will be a readjustment and that this scale of prices will have a downward trend, in which case meat may decline with that of other commodities. It would be very surprising if there were not a downward trend.

It is apparent that the inflation of the currency in Europe as well as in America has been the principal factor in causing high prices on meat as it has been on all other commodities, especially during the past four years. January 1, 1914, the per capita circulation in the United States was $34.11 and October 1, 1914, $37.15. Since that time it has steadily increased until December 1, 1918, when it was $56.23. October 1, 1919, it had dropped back to $54.58. The war has doubtless
been responsible for a large part of our increase since 1914. It has been stated that a billion dollars in gold has come from Europe to the United States as a result of the balance of trade in our favor in the purchase of munitions, foods, etc. The large issue of bonds for our needs to conduct the war has added further to the volume of currency in circulation. However, the inflation of the currency began several years before war was declared. Statistics show that the annual production of gold in the world was for several years preceding the war twice as great as the increase in the population of the world, due to the opening of new mines, such as those in South Africa, and to the discovery of new methods of extracting gold from ores of lower value. A large part of this increased supply of gold was coined into money, serving to enlarge the volume of currency in all countries to a greater or less degree. Much of this increase in the supply of gold has come to the United States since the beginning of hostilities.

Our currency and credit facilities were further augmented during the year 1914, by the establishment of the Federal Reserve Banking System, through which it has been possible to issue paper money in lieu of notes received; whereas before the establishment of the Federal Reserve Banks in 1914, paper money issued had to be backed by its face value in gold or silver, or government bonds. It is now possible to issue paper money backed by commodities. For example, a farmer's note amounting to $10,000.00 for the purchase of live stock can be sent by a member bank to the Federal Reserve Bank and $10,000.00 of paper money can be issued in lieu of this note, plus $4,000.00 in gold reserve. The fact that the Federal Reserve banks of the country are now near their legal limits in the making of loans is proving that this new departure in financing business has contributed materially to the increase in money and credits and has stimulated prices.

As practically no further inflation of the currency can result from the working of the Federal Reserve system of banking, and as the yearly production of gold is now on the decline, due to the high cost of labor and equipment in proportion to the price of the product, which in the case of gold remains stationary, there is not likely to be any further inflation. On the contrary it would seem reasonable to expect a gradual deflation and a receding from the present scale of values.

The hog market has been subject to fluctuations in prices from month to month and from year to year. The largest advance
came after the United States entered the war. Twenty years ago, or during the year 1899, the average price of hogs at the Chicago market was $4.95 per hundred; for the year 1915, $7.10 per hundred; 1916, $9.60 per hundred; 1917, $15.10 per hundred; 1918, $17.40, and for the first eleven months of 1919, $18.40 per hundred. Notwithstanding the fact that our exports of pork and pork products increased from 1,748,854,784 pounds during the first nine months of 1918, to 2,199,856,955 pounds during the first nine months of 1919, the top price of hogs in Chicago is today $14.60 per hundred as compared with $20.95, the record price made in September, 1918.

The estimated number of hogs in the United States January 1, 1919, was 75,587,000 as compared with 70,978,000 January 1, 1918. The receipts of hogs at the Chicago market during the first eleven months of 1919 was 7,629,165 as compared with 7,614,391 for the first eleven months of 1918, much in excess of the receipts for 1917. By the end of 1919 we will have exported approximately 25 per cent of our total production of pork for the year; whereas our exports of beef will represent but 5 per cent of our total output for the year. There is reason to believe that Europe will continue to take our surplus of pork for some time, as the best statistics available show that there were at the close of the war 53 per cent less hogs in Europe, exclusive of Russia, than preceding the war. This deficiency of hogs in Europe is seven million more than the increase of hogs in the United States, Canada, Australia and Argentine. To be sure, hogs multiply very rapidly and we may expect that much of the present shortage of hogs in Europe will be overcome in the next few years.

The greatest handicap in getting our surplus of pork to Europe now is the high rate of exchange. If substantial loans or credits could be granted to European buyers, this handicap would be largely overcome to the benefit of all hog raisers of the United States. In supplying the people of Europe with their requirements for pork, we have little competition. Argentine and Australia are heavy producers of beef but these countries produce very little pork. The adaptability of the United States for the production of corn makes this by far the greatest pork-producing country in the world. Nothing should be left undone to give us an unrestricted outlet for our surplus product. It is greatly to be hoped that the peace treaty will be signed without further delay to permit this needed financing of European buyers.
The average price of fat lambs on the Chicago market was $10.75 per hundred for the year 1916, $15.60 for the year 1917, $16.60 for 1918, and $16.95 for the first ten months of 1919. The total receipts of sheep at the Chicago market for the first ten months of 1919 was 21,858,613 as compared with 18,258,679 for the same period in 1918. Top lambs are now bringing $14.65 per hundred. While there has been an increase in the number of sheep in the United States during the past two years, we still have considerably less than ten years ago. The flocks of Montana and other western states have suffered depletion through the farming of what was formerly grazing land. There is now a growing interest in sheep raising under farm conditions, and if the price of mutton and wool is satisfactory, we may expect to see many more small flocks throughout the country in the future. It is greatly to be hoped that with this increase in number there will also be an improvement in quality and condition with more pains taken to castrate the lambs. Native lambs are not up to western standards on the average.

Under good care a flock from fifty to one hundred ewes on the average farm will bring net returns that will compare favorably with any other class of live stock. Their adaptability to consume weeds and to pick up waste from stubble fields, and their capacity to produce a finished meat product from grass and roughage with a minimum amount of grain, entitles them to much more favorable consideration on our farms than has been accorded them in the past when grain was relatively lower in price. In these days of scarcity of labor and high priced wages, with the limiting factor of farm production, a matter of labor to a larger degree than of land, the growing of more sheep will furnish something of a relief to this situation. These animals are capable of converting into meat and wool—both high priced products—not only grass and hay, but unhusked corn in the field, with a minimum of labor required for their care.

The dairy industry of the United States has been in a very prosperous condition, due to the high prices which have prevailed for milk and its products. Net profits in the dairy business itself have been only fair because of the abnormally high prices of feed and the increased wages which have been paid. High priced labor cuts in heavier on the profits from dairying than in any other branch of the live stock industry, because more work is involved. Dairy farming, while intensive, leads to increased fertility and larger crops, which contribute much
to the prosperity invariably found in a well-developed dairy section. Like many other American industries, dairying in the United States has profited by the foreign demands for our products occasioned by the war. In 1914 our imports of dairy products exceeded our exports by 4,148,425 pounds of butter, and 61,356,736 pounds of cheese. We exported, however, that year 16,209,082 pounds of condensed milk in excess of our imports. In 1915 our exports of dairy products exceeded our imports by 6,022,477 pounds of butter, 5,824,397 pounds of cheese, and 37,235,627 pounds of condensed milk. In 1916 our exports of dairy products exceeded our imports by 12,790,281 pounds of butter, 14,306,252 pounds of cheese, and 155,734,322 pounds of condensed milk. It is apparent from the above that in two years' time, 1914 to 1916, we changed from a country dependent to some extent upon foreign nations for dairy products to a nation having a good export trade, especially in condensed milk which increased from four million pounds in 1914 to over one hundred and fifty-five million pounds in 1916.

During the first nine months of 1917 we exported 270,816,995 pounds of condensed milk in excess of our imports, 1918, 378,375,253 pounds, and 1919, 603,236,378 pounds. This unusual demand from Europe for our condensed milk was an important factor in maintaining high prices on all dairy products during the period of the war. This trade is also no doubt responsible for the material increase in the number of dairy cows in the United States during the past four years. From 1907 to 1914 there was almost no variation in the number of dairy cows in the United States, the government estimates stipulating a little over twenty million each year. However, since the outbreak of the war in 1914, the number of milk cows in the United States has increased on an average of 2.5 per cent each year. Inasmuch as the countries of Europe have at the present time approximately 11 per cent less cattle, mostly the dairy type, than preceding the war, there will be a fair demand for condensed milk from the United States until the European herds are restored to normal. With a marked decline in our shipments of condensed milk to foreign countries which may come in the near future, a lower scale of prices is almost certain to follow. This will probably send to slaughter a large number of cows of mediocre capacity and of questionable economic value as milk producers. It does not mean, however, that the future of our dairy industry will be seriously affected, because we have increasing home requirements. The people in the United States are becoming more and
more appreciative of the great food value of milk and its products. It will unquestionably result in the keeping of a much better class of cows for milking purposes, and in some sections cows that combine milk with beef production in a profitable manner.

No branch of the live stock industry has been subjected to more pronounced influences affecting supply and demand than the raising of horses. The growing popularity of trucks and tractors, not only in cities but on our farms, has injured the horse market to a large degree. The beginning of hostilities in Europe which took a surplus of horses off our hands has furnished considerable temporary relief. However, even with the great destruction of horse flesh caused by the war and the retention on the other side of our horses in service at the close of the conflict, there is still a surplus, in proportion to present demands, of the light-weight and medium weight kind. There is not a surplus of heavy horses. On the contrary the demand for that type and the prices paid are very satisfactory. A large number of business institutions in our cities would purchase heavy horses in preference to trucks for various reasons, if it were possible to procure sufficient horses of that type at reasonable prices. Long distance hauling in our cities can be done more economically with trucks, and the prevailing high prices of feed have contributed to a large extent to make the horse less popular when trucks or tractors can be used to equal advantage. Much city hauling, however, can be done more economically with horses, and the heavy kind will continue to be in good demand at attractive prices.

The future of the live stock industry as a whole is promising. While we naturally expect a gradual lowering of prices during the readjustment period, by the restoration of the normal forces of production and to some extent, by the deflation of our currency, there is reason to believe that agricultural commodities will decline less in price than will manufactured articles. Underproduction in articles of manufacture has been without question a large factor in causing exorbitant prices on such commodities; whereas agricultural production has not diminished to any extent as a result of the war. It would seem, therefore, that with normal conditions restored we may expect a greater decline in prices on manufactured articles than on agricultural products. This will depend largely upon the future attitude of labor unions. If these are successful in reducing still further the number of hours of actual employment per day at increased wages, manufactured articles will continue high in price, or we
will be buying heavily of products made with foreign labor to the detriment of our own prosperity.

Conditions with respect to agricultural production are very different now from the conditions which prevailed after the Civil War. At that time large areas of rich new lands were available for occupancy. The demands for food by an increasing population were met by the cultivation of more land. In the course of time overproduction in agricultural commodities took place. We now have comparatively little unoccupied land suitable for farming purposes. Increased requirements in the future must necessarily be met by the adoption of better methods with the land already occupied. The trend of our population has been toward the cities, increasing the requirements of consumers and making still more difficult the problem of adequate production, hence improved methods of farming, particularly in the care of live stock will be a valuable aid to our country in the solution of a momentous question.

The situation with respect to limitations of the western range country for any further expansion need not cause any particular apprehension. While grain fields have supplanted large grazing areas, more roughage will be grown under dry farming methods and more cattle will eventually be found in these western states than were there under strict range conditions. Many more cattle will be raised as well as fattened on our farms. In round numbers, 60,000,000 tons of cornstalks are produced annually in our so-called corn belt states, and approximately 40,000,000 tons are not utilized as feed. This material, properly conserved and supplemented with a small quantity of clover or alfalfa hay, or a still smaller quantity of oil meal or cottonseed meal, would keep in good breeding condition 10,000,000 cattle per year. A large tonnage of oat straw is annually produced, much of which could be fed to advantage. The chief handicap in breeding more beef cattle on our farms in the corn belt has been the high cost of summer as well as the winter maintenance of breeding cattle. The more recent practice of converting cornstalks without the grain into silage will reduce materially the cost of winter maintenance. Sweet clover pasture, which will support three times as many cattle to the acre as ordinary pasture will help to reduce the cost of maintaining breeding cattle on high priced land during the summer season and will make it profitable to use more of this high priced land for pasture purposes. We may reasonably expect in the future many more baby beeves raised and fattened on our corn belt farms. In our winter feeding operations the high
prices of corn will force us to make larger use of good roughage, such as silage, alfalfa, and clover hay, with correspondingly less grain for the production of beef, mutton and dairy products.

The quality of our live stock has greatly improved during recent years. The International Live Stock Exposition now in progress, various state fairs and educational institutions have exerted a marked influence in this direction. High priced feed has also been a factor. We can no longer afford to waste feed on scrubs. Our aim from now on, more than ever before, should be to keep on our farms those types of animals that are capable of converting our feed into the largest number of pounds of the best quality of product.

To you men and your associates is entrusted the great responsibility of keeping as free from disease as possible, the immense aggregation of farm animals in the United States, worth at the present time approximately ten billions of dollars. Diseases to which the animal kingdom has been subject have been the cause of great economic losses. If these diseases can be materially reduced, it will be a real benefit to both producers and consumers. You are to be congratulated upon the distinct progress which has been made during recent years in combating such diseases as hog cholera, Texas fever, and blackleg. It is to be hoped that during the next few years your research work on contagious abortion will result in the discovery of practical methods of coping with this serious menace to the cattle breeding industry. You are to be further congratulated upon the successful beginning of a nation-wide campaign for the eradication of tuberculosis in cattle and hogs. Many of us have never realized the seriousness of this problem—the heavy annual losses that have been caused by condemnations for tuberculosis, the great prevalence of the disease among dairy herds and the real hindrance it has been to the development of our live stock industry. It has been subtle and insidious in its progress, likened to a smoldering fire of wide expanse, causing great damage, unobserved to a large degree. Fortunately, we are awake to the needs of aggressive methods in preventing its further progress. We now have an appropriation of $1,500,000 for the year, provided by our National Congress with approximately a total of $2,000,000 made available by the various states of the union. This has made possible the building up of a great machine by which we have been able to begin in a most encouraging way a cleaning up process which is certain to prevent an annual property damage many times the cost of
eradication. The percentage of animals retained and condemned for tuberculosis as revealed by the reports of the Division of Meat Inspection is the best barometer of conditions with respect to the prevalence of this disease. Recent reports from the Division of Meat Inspection show reduced losses and indicate that a good start has been made in eradicating tuberculosis. It is to be hoped that this great leak in our live stock industry may be effectually stopped in a comparatively few years.

There has never been shown a better spirit of co-operation between breeders and the veterinary profession in combating tuberculosis than now exists in the United States. A sentiment among breeders is rapidly developing in which the pride and satisfaction of having a herd free from disease is quite as great as that of having animals of superior quality. It is not only a matter of sentiment, but to a still greater degree a matter of business sagacity. Our southern country which is fast developing into a great live stock section is demanding seed stock from herds entirely free from tuberculosis. In our dealings with South America, that portion of our Western hemisphere which perhaps offers the greatest possibilities in live stock development, it will be to our distinct advantage to supply to them not only cattle of the desired type, but those which are free from tuberculosis. It is in this that we may, if we are wise, take advantage of conditions which now exist in Great Britain, our chief competitor.

There is a great future for the live stock industry in the United States. We are no longer dependent upon other countries for improvement in our herds and flocks by the infusion of foreign blood. We have within our own borders some of the best breeding herds in the world. We have men of unusual skill and intelligence making every effort possible to bring about improvement not only in quality of product but in sanitary conditions surrounding the industry. In this improvement there should be the fullest co-operation on the part of all identified with the business. In our eagerness to eradicate disease we should also keep in mind other phases of development. Our effort should be to perform the greatest good with the least disorganization, having in mind at all times what is best for the live stock industry of the United States.

President Dunphy: Gentlemen, you have listened to this very comprehensive paper in regard to the live stock conditions of the United States today. This is open now for discussion, and we will limit the discussion to about twenty minutes.
TUBERCULOSIS AND THE BEEF INDUSTRY

By Frank W. Harding, Chicago

When I was invited by your secretary to read a paper to this convention, I was prompted to ask him along what lines he wished me to speak, and I can assure you that it was gratifying to me, and it has been gratifying to the many breeders of beef cattle in the country that I have talked with, that it was your president's reply that he believed that the secretary of the Shorthorn Breeders' Association should be in a position to present the thoughts which our breeders have on the subject of tuberculosis legislation, that line of work in particular, so that they feel honored in having had a selection from among them made to talk to you today.

I believe that I express the strong sentiment of all our beef cattle breeders when I state that they favor nationalization of this subject, and the most uniform regulations and methods of dealing with the subject of tuberculosis that can possibly be agreed upon between all the states and the national government.

You know that the breeders of the country have been put to a great disadvantage through the lack of uniformity of regulations. I will just mention a few points. Some states I believe require that cattle shall be tested within thirty days of the time that they are shipped into the state. A great many of our cattle are sold at public auction, and our breeders like to know when they catalogue the cattle which they are to sell that they are all right, and free from tuberculosis, and right to be shipped from one state to another, and this should be done, in order to get out the catalogue properly, and advertise the offering, in not less than sixty days from the time that they are to be sold, so that anyone making sure that his cattle are right, and testing them within sixty days of the date of the sale is obliged by certain states to re-test for shipment. That is one thing, the matter of one state or a number of states at this time requiring a sixty or ninety-day re-test on cattle entering their states.

Now, you have in your individual position figured that that is a very good thing. Possibly it is. I am not here today to combat your ideas. Your ideas are technical. Our point of view
has been probably principally along the line of developing the highest types of registered cattle.

As far as the shorthorn breeders of the country are concerned, they are pretty well in line to stand back of their cattle wherever they go for a period of sixty or ninety days. When you require this re-test, it causes a suspicion that they are selling cattle that are not all right. I believe confidence placed in them where you have tested them as you are able to test them with this standardization and this nationalization of veterinarians is a great advance step in having these cattle in proper condition to go to the different states.

I think the time is ripe when you can do away with these regulations for retesting, and put it in the hands of the breeders of the country. You have no idea of the sincerity of the breeders generally in efforts to get their herds free from tuberculosis, and they are going to pretty well take care of this situation without regulation.

Many states, or several states require, before the exhibition of cattle, that they shall have had a test before being shipped to their shows. Possibly that is a good thing. If it is a good thing, it could be still further improved upon for the convenience of the exhibitors, and in co-operation with the breeders' associations that are now putting up a vast amount of money in prizes to encourage the breeding of better types, and the shipping of these good cattle, if uniform methods were adopted. A test made when the exhibition herds are started out, that would be good for the entire circuit, would seem to be entirely in line and practical.

As an instance, our association appropriated many thousands of dollars toward the prize-list of shorthorns in the southwestern shows. We made an extreme effort at the Texas State Fair by a very liberal contribution to their prize-list, to encourage a number of the leading herds of the country to congregate there, and after that show to exhibit at the adjoining state fairs which were all in the circuit; but many of these men found themselves in a predicament—the test on their cattle had expired, and they could ship them out only on condition that they shipped them direct to their homes.

Now, you see, gentlemen, that was in direct opposition to the support that the Breeders' Association had given these fairs and these breeders, so that some of our principal men, unless they had their cattle tested, were obliged to ship straight back to their homes and could not show at the other fairs.
Now, on the tuberculin test itself, you know, and the breeders of beef cattle of the United States know, that the tuberculin test as applied is the best test that we have. It is the test that determines for us the best of any other method, whether our cattle are right or wrong; but you all know, and the breeders of beef cattle of the United States know, too, that it is not an infallible test. There are many disconcerting things happening in connection with the application of the tuberculin test to determine beyond any doubt whether cattle are free from tuberculosis or not.

As an instance to go back a number of years, an article appeared in one of our leading live stock journals from Dr. Alexander, whom you all know or know of, in which he made the statement that he did not believe that valuable breeding animals should be condemned for tuberculosis on one test. I did not think much of that statement at the time. It seemed to me that if all these valuable cattle had to be tested twice, we would never get anywhere in determining whether they were reactors or not. But do you know that many breeders of the country today are coming to believe that possibly Dr. Alexander's suggestion, so many years ago, was possibly a good one?

You men here must know that with the contradictory evidences and indications of temperature that you meet, you are not always certain of conditions. Take a lot of cattle, particularly those in good condition, and their temperatures run higher than outdoor cattle, we will call them. I have known of cases where a hundred cattle were to be tested, and ten head out of that hundred on the day that they were to be injected, had abnormal temperatures, they were too high to be injected. Of course, the men doing the work could not test them, it was not in accord with the regulations to do so. They were allowed to go over to the next day, perhaps the second day, until their temperatures became normal, and were then injected, and passed the test, we will say. But now what would happen if this condition had been present the day following the injection, and you would have these rising temperatures? You see if it was not a correct cycle, those animals should not be condemned as reactors. What would look like a cycle in one case would look different in another. Temperatures go over 104°, we will say, and comply with the amount of variation, and it is felt that that animal should be condemned, and in that way there are a great many good cattle that are not passed, or that are condemned, and through the regulation that once a reactor always a reactor, they are not fairly tested.
Now, some concrete cases. At our Shorthorn Congress last February, all cattle were sold subject to a 60-day retest, regardless of the regulation of the state. The shorthorn breeders of the country wanted these cattle to be right for their customers, and they were sold subject to a sixty-day retest. There were nearly 300 head of cattle, and I personally know that 90 per cent of those cattle were retested, and out of the entire number we had eight head that failed to pass the retest. I asked for the charts of two animals in particular that I had more or less personal knowledge of, and the men whose hands they had gone through, and I was confident with the reliability of the test, that unless there was some untoward condition, these two cattle should not have been condemned. I felt reasonably sure of it, and I got permission to have the two animals retested. You understand that they had been declared tubercular. There was not a perfect cycle in the test. I don't know whether that is always used as a determining factor or not. The two animals were carried along sixty or ninety days, I don't remember the exact number of days, and both of them passed an excellent test. Those were the only two animals in that group that I took up, and that was the result.

The breeders of the country know these things, and are anxious to work with you, but in view of this, possibly some plan can be worked out for cases where we cannot be too sure of the results without a second trial, and right here comes the next point, of branding these good cattle that are to be maintained.

I know a number of breeders that favored the segregation of these cattle that they were going to be allowed to keep, but when they found that they had to have a "T" put on their animals in a conspicuous place, it did not appeal to them as it would if they had been placed on their honor, perhaps, not to dispose of these cattle. That would be the intention, and I don't know that is going to work out satisfactorily. We can fairly assume that we want your co-operation, and you want our co-operation. You are making yourselves felt to be of great value to the breeders and if you will preserve that feeling you are going to get the co-operation that in the end is going to clean up this disease and get it on the best possible basis in the least possible time.

As to the cost of testing, I believe I am stating the fact that if an animal is sold in Wisconsin and a veterinarian is called to make the test, that it costs $20. That is the average cost that is permitted by the Sanitary Board. I may not be quoting Wis-
cousin right, but this will serve for an example. I do know that in the state of Illinois, when I or any other breeder in the state brings in an animal and applies for a sixty-day retest, that we are obliged to pay $20 for the test. That makes a cost of $40 for determining whether this animal is free from tuberculosis. Many bulls are sold for grading, for the upbuilding of the quality of the beef cattle of the country at a price around $200, and it is all out of proportion, it seems to me. I don't know just how this is going to be worked out, but $40 from the $200 that the average breeder, we will say, gets for his investment in maintaining and rearing an animal seems to me to be entirely out of proportion.

There is a large appropriation available for the eradication of tuberculosis. I know that there are some breeders in the United States that feel that these registered cattle should be paid for, at least, part of their value, when condemned for tuberculosis. I don't know whether they are united on that. I believe there are a great many breeders who favor the segregation and saving of any breeding cattle, and the use of the appropriation for you men that are doing the work of testing and the eradication of disease. Personally I think that is what the money ought to be devoted to.

You have made great progress with the accredited herd plan. At the same time it is only a very small beginning that has been made. I cannot at the moment quote the number of accredited herds in the United States, but I believe it is something less than 500, and I believe that the number of shorthorn herds is second to that of any other breed in the United States in the number of accredited herds. We have 35,000 herds of registered shorthorn cattle in the United States, and other breeds in proportion so that your field is large, and you have just made a beginning.

In the interest of getting at this thing quickly and doing more of it, couldn't we have what you might call an observed herd or a controlled herd, or an approved herd? You say to a breeder of beef cattle—I am talking about beef cattle, because I don't think I know just the points of view of the dairy breeders of the country: "You join with us, put your herd under our observation, and our care, and we will segregate any animal from your herd that reacts to the test. It will be arranged so that you can go on breeding and mating these animals that are producing these good cattle. We will do this work in the hope that we have your co-operation and you have ours,
so that it is going to be just as safe to ship an animal from
your herd to your friend’s herd, or to some other state, as any
plan that can possibly be adopted.” You all know that in some
cases animals from accredited herds, have gone to other states,
and have not stood a retest. We don’t know why it is, but there
have been cases of that kind. I believe that, personally, I
would prefer to buy cattle that have been tested thirty days
before. I believe that you would deal with ten men where you
are dealing with one now. They would all be anxious for this
co-operation that I speak of, and I believe that we would con-
serve a lot of good cattle that way. That is a nearly opposite
proposition to the accredited herd plan.

Mr. Smith sent a letter to me the other day, in which I
noticed the recommendation was being made that at least the
herd bull be excepted from your regulation, but that other ani-
mais in the herd should pass a test. I think that is a good plan.
You know that many of the good cattle, these highest types,
are produced from reacting sires and dams.

I am wondering if it is not the desire of a great many of
our cattlemen to acquire absolutely accredited herds if it were
not for the time required and if we went into this control propo-
sition, I believe we could protect every breeder in the United
States through such a plan.

The American Shorthorn Breeders’ Association puts out a
uniform guaranty that they recommend, and we say in that
uniform guaranty, that if that animal is federally tested, or
tested by a man especially delegated by the State Live Stock
Sanitary Board, that a retest will not be necessary, that the
work will be done right, but that in case he is not a federal
agent, but is especially delegated, that a copy of the authority
of that delegation to go and test that herd of cattle to be sold
at public auction shall come to our office.

One of the first to come in was a letter which read this way:
“We will delegate you to go and test that herd of cattle, but
give them a good strong dose of tuberculin.” That man was
convicted by that letter when I knew absolutely that he was
entertaining the matter in the best of faith. Why was his
herd of cattle to be given a good strong dose?

I think there is a disposition that if an animal has been tested
once or twice, sold in one sale and then in another, that the
doses should be increased. I was talking with an eminent phys-
ician in charge of a human tuberculosis sanitarium, not long ago,
and in discussing the tuberculin test, he volunteered the state-
ment that in applying the test they were trying to make it as uniform as possible. If the suspect passed reasonable test, that was satisfactory. To try to make them develop a case of reaction was not satisfactory. You understand the technicalities. I have been told that it makes no difference whether you give a large dose or a small dose, if the disease is there it is going to react, whether the dose is small or large, but if that is the case, why is the dose varied? There have been instances in which several times the ordinary dose has been given animals in second and third tests. I have heard it explained that a tuberculosis lesion could be encased, and that it took a very large dose to break down the covering in order to reach the lesion. I know from experience before the tuberculin test was used to a great extent, that until cattle were injected, they seemed to be going along, thriving, living all right, they would possibly generalize the disease, that is what we are told, and that seemed to be the first result from the test, that one or two animals would go down suddenly, so there must be something that breaks down the covering there and generalizes, where if an ordinary test were made, the animal would go along and live a natural life, and it is up to you to determine which is the most valuable line of treatment.

I think it was three years ago that you had your first joint meeting with the Breeders of the United States through their representative, and I cannot tell you how much they appreciated the opportunity of discussing this subject, and the cooperation which they felt that they were getting by meeting with you, and I understand that you will again meet tonight. I think I can assure you that the breeders of beef cattle favor the tuberculin test. It is the best thing that we have, and if some of the points that make the situation difficult could be dealt with in a little different manner, you would have the full and united cooperation. I believe the breeders of the country recognize that cattle that pass the test best are more regular breeders than those that do not.

PRESIDENT DUNPHY: Gentlemen, as there are several papers along the same line, I think we will not discuss this until we hear from the breeders representing the dairy industry.

The next paper on our program, is "Tuberculosis and the Dairy Industry," by D. D. Aitkin, of Michigan, president of the American Holstein Friesian Association. Mr. Aitkin has intimated that he will ask for a substitute.

MR. AITKIN: Mr. President, I took it for granted that this body of men would be more interested in actual experiences than in theories and impressions, and as Senator Hackney, one of the largest breeders in
the country, and owner of one of the largest accredited herds is present, I would ask that he be permitted to discuss this problem in place of myself.

President Dunphy: Gentlemen of the Association, you have heard Mr. Aitkin's request that Senator Hackney be substituted for him, in discussing the tuberculosis problems in dairy herds. I take great pleasure in introducing to you Senator Hackney, of Minnesota.

TUBERCULOSIS AND THE DAIRY INDUSTRY

By J. M. Hackney, St. Paul, Minn.

You know one of the biggest problems I have had as a breeder of cattle has been to get men who understand the diseases of cattle. In our section of the country, and I presume it is true in many sections of the country, we have plenty of the old-fashioned veterinarians that know all about horse diseases, but it has been very hard to get men who have had the technical training and the actual experience in handling diseases of cattle, especially diseases of dairy cattle.

It is not necessary for me to say to you that diseases of dairy cattle are far greater and harder to handle than diseases of the beef cattle, because a large proportion of the beef cattle of the country are in the open, and they are not so apt to acquire diseases as are dairy cattle where many are kept inside. I am glad that you have an organization of this kind that has a duty to perform to the people as a whole, as well as to your profession.

In my judgment your organization, and you as veterinarians—I take it most of you who are here today are veterinarians—have as important a place to fill in this country today as has the medical profession that looks after humankind, because you are dealing largely with problems of food for human consumption, whether it be beef or dairy products.

I did not have time to prepare a paper, as I have been tied up as foreman of the grand jury in our city, but I hope before I get through to say enough to interest you from the standpoint of one who has had actual experience in dealing in both beef cattle and dairy cattle.

In my young life I was on the ranges of North and South Dakota, and I had some experience as a cow boy. One of the best things that we learned as cow boys was that between man and man, the best rule was to treat the other fellow as you expected to have him treat you. In other words, as cow boys we learned and practiced the highest ethics in all of our business transactions. Sometimes it was necessary to enforce it a
little differently than we enforce it now, but we did it. Later on in life I decided I wanted to acquire a dairy herd of Holstein Friesian cattle, I naturally expected that in acquiring these cattle I would meet the same general line of ethics, morals and business, that I had acquired as a cow-boy; so I went east to get a herd of Holsteins, and they handed it to me, and handed it to me properly.

I want to say to you right off the reel today that any man who puts an animal up for sale, whether at private sale or at an auction, who has within his mind the knowledge that that animal is tubercular, if I was a member of the grand jury, or any other jury, I would indict that man and convict him just as quickly as though he had shot his hired man in the back yard. No man has a right to sell that kind of an animal. Of course, if he has no knowledge of the situation, that is a different story. I am not telling you this because I am sore at what some fellows handed me years ago, but because I want to impress upon your minds the fact, that you as an organization have a great duty to perform in every state in this union, to see that the live stock industry, whether cattle, hogs or sheep, is put upon the highest possible plane, and I have nothing but the utmost contempt for the veterinarian who sinks so low in his profession as to assist the breeder of cattle in covering up a crime of that kind.

I am very glad, in fact I feel, that no such man is present in this organization today. It is one of your solemn duties to see that the membership of your organization is kept free from such men, and to demand that only men of high character and high thoughts shall represent your profession, because it is only in that way that we can build up this cattle industry, whether beef or dairy.

In my experience, I have proven to my own satisfaction that the tuberculin test is the only true method of determining whether an animal is infected with tuberculosis. I lost a large part of my best foundation animals several years ago by tuberculosis. We know that no man up to this time has been able to discover a cure for tuberculosis in cattle. We can cure abortion. Many cows become immune to abortion, and go on breeding and live their natural lives. Not so with tuberculosis. Once a reactor, always a reactor.

We had before the Minnesota senate several years ago, when the tuberculin test was new—many skeptics. Some thought it was only 25 per cent, others said 50 per cent efficient. There
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came before the senate a bill to abolish the tuberculin test. As a member of the Live Stock Committee, I was asked to take charge of the opposition to this bill. The brightest men in our senate were lawyers, who knew little about diseases of cattle, and I had great trouble to make them understand what I was driving at in my opposition to that bill. One good old senator said to me: "Hackney, I have got a herd of about fifty short-horns up in Kitson County, and you can take the whole lot and make such use of them as you want." I said: "All right, we will take twenty-five of them. I will go up there and select them." We branded the cattle so there could be no skulldug- gery of any kind, and out of the twenty-five nineteen reacted. The bull was a prize show bull, the fattest, finest looking one I have ever seen. We brought them to South St. Paul, and I invited the whole Committee, in fact the whole senate, to go to see the animals slaughtered. The entire nineteen head had lesions that any layman could see, and the bull was practically rotten.

Even then I could not convince the senators who had not seen it that I was telling the truth. So I had the lungs and the liver and the heart and the infected parts of many of those animals brought up and placed upon the marble tables in that magnificent capitol building of ours. I preserved them in alcohol and you ought to have seen the crowd gather around those jars; and those blooming lawyers that I had had so much trouble with said: "We never thought such a thing could be possible, that animals could carry tuberculosis lesions that an ordinary man could see. We supposed it was something that could not be seen except by microscopical examination." The result of this was that we killed the bill to abolish the tuberculin test.

Now, I am coming to the point that I wanted to make. You fellows have got to do more than simply go around testing cattle. You have got to help the other organizations that are working to abolish this disease by showing the mass of people what tuberculosis in cattle means.

I daren't say if you would take samples such as I procured there at South St. Paul and put them on a table down in the lobby of this hotel, there would be a crowd around it continually, and it would do more to impress upon the mind of the average man or woman what this disease means than all the talking you could do if you held your convention here for the next four weeks. So I want to suggest that every breeding organization do something of this kind to show the people what this disease means. I am going to advise our Holstein Friesian
Association of America, through their Extension Department, that whenever they have a display booth to have a jar containing specimens from a tubercular animal, and demonstrate what it means, so that people may understand it.

We must give the public the right understanding of what tuberculosis in cattle means. It does not mean, of course, beef cattle, because the parts are cut out and thrown away, or the carcass is cooked before it is eaten, but it is different with a dairy cow. We drink her milk and eat her butter. I kept a herd for several years that was known as a Bang herd—you know what that means—those dairy cattle that I was telling you about that they handed me down east. I put them up on another farm and I kept them for nearly five years, I retested the cows once every year, and every time they reacted. The calves that I took from the cows were taken to another farm, and some of those were my greatest foundation animals, and I never lost a single calf taken from that Bang farm by reaction. But finally I gave it up. It was a constant source of worry, and I simply gave it up and forgot about the “Bang” farm, and have devoted myself to trying to keep a clean herd.

There are some animals that it would be a crime and a shame from the standpoint of the Holstein people—because I am speaking on that subject—to dispose of, because of their value and their high producing qualities which are being transmitted, and the public has a right, and breeders have a right to some of it, so I would not advise killing such animals if they can be properly isolated from the rest of his herd.

I have an accredited herd, and the government list shows that my herd is the largest one in the world. I have had them for nearly four years and I have been able to keep them without a single reaction. I have done a million things to bring that about. I have worked harder at this proposition than anything I have ever done in my life, and I have found that the old saying, “eternal vigilance is the price of liberty,” applies to the dairy industry in keeping a herd free from tuberculosis: I have had to do everything under the sun to keep clean barns, hire clean men, men who are eternally keeping in mind, that the disease may come back, watching it everywhere, watching every possible point.

We use the utmost caution at my farm in purchasing animals. I will not purchase an animal unless I first investigate the reputation of the breeder that the animal comes from, and the reputation of the veterinarian that has been testing his herd.
If I find anything wrong with the veterinarian, or anything wrong with the breeder, I let that man alone, even though his cattle sell for half what I think they are worth, and I only buy them upon a 90-day retest. I have no use myself for a 60-day retest. It may be all right. You veterinarians may not agree with me on that, but I require a 90-day retest. I am speaking now of my own personal requirements in Minnesota, which are based upon the laws of my state, which I consider among the best in the union.

You probably will be interested to know something about what we are doing in Minnesota. In Minnesota we have approximately two million cattle, but it is approximately that, so what we are doing in this tuberculosis problem is small, and yet it is a wonderful showing. I have a letter from Dr. Fretz in which he says that we have 1,410 herds, consisting of 45,000 cattle under supervision in Minnesota. They consist of 268 herds, total 7,380 cattle fully accredited; 825 herds of 17,900 cattle which have passed one negative test; 327 herds with a total of 9,400 cattle in which less than five per cent of reactors have been disclosed. He says:

"I think it will be safe for you to make the statement that Minnesota leads all states in tuberculosis-control work on pure-bred cattle."

I am not saying this, gentlemen, to boost Minnesota, but simply to state the fact that we are doing a great work in Minnesota to eradicate tuberculosis. Many breeders in Minnesota have come to me and said: "What are you going to do if any of your animals react? They will take you off the list as quick as that, and all the advertising that you have been able to get because of the fact that the Government has made your herd an accredited herd will be lost." I have had no reactions in the last three or four years, and I cite my own case simply as an illustration. I believe that you men will have to assist in securing different laws or rules with reference to accredited herds. I have no particular plan to offer, except that I believe that it is unfair the first time a herd shows one or two reactors to immediately take that herd from the accredited list, and refuse to put it back for twelve months. I think it is wrong. I think a man should have a right to have his herd tested within three or four months after he is taken off from the accredited list. Why wait twelve months? Is there any reason for it? This is something I wish you would discuss.

I believe that there should be some classification that would inspire a man to acquire the very best herd he can get. Many
in Minnesota are afraid to go on the government list, because they are afraid they will get kicked off the minute they show a reaction. What I am trying to do is to get some method that will make it possible for every man to climb the ladder, and the higher he goes the more protected he is with the government back of him. As it is now, you are preventing a lot of men from acquiring that distinction.

In my case it just happens that I have been fortunate enough to keep it out of my herd, but there are a lot of fellows who want to go on and who are afraid to go for that reason, and I think the rule ought to be changed to that extent.

I want to say a word about the sire question. There isn't any argument but what a great transmitting sire, if he should acquire tuberculosis should be killed, or destroyed, but that man who owns a herd that is on the accredited list, whose sire becomes tubercular, should have more consideration because the sire is tubercular. I do not see any reason why the ruling cannot be regulated so that man can still have his herd on the accredited list under proper supervision all along the line, and still use that sire. I have never had a bull on my farm react, in my nearly fifteen years' experience, so I cannot speak on that question from actual experience, but there are men in Minnesota, and I know them very well, who have good sires, that unfortunately have reacted, and I think that the rules should be changed, so that where a man has a good sire and he reacts, that he may be allowed under reasonable supervision to keep him. Where he can be used without danger of infection, why should that herd be taken from the accredited list simply because it has a tubercular bull?

I want to impress upon you in closing what I said before, that this is a great industry. Talk about your iron ore, talk about your wheat fields of America and Canada and Australia! Why, there is no industry that can anywhere reach the magnitude, the value of the beef and dairy industry in this country or any other country. Is there any proposition that can come before the people that is of greater interest than the diseases of our cattle, the diseases of our sheep, hogs, our horses? We ought to launch a campaign against the disease of tuberculosis that will reach to the very ends of the earth. I am sending through Chicago tonight two heifers on their way to Capetown, South Africa, because I was fortunate enough to have my herd clean and free from disease. I never saw the buyer. I think he bought them largely because he knew my herd was clean. Think what it means to have a clean herd. But on the other
hand, think what it means to the people of America if we do not eradicate this disease that is going to the very heart of our civilization, and affecting the lives of our children. We have got to make the people understand the force of this disease, to realize what it means. I have the greatest contempt for many men in the medical profession that are not in this movement, with their knowledge of the terribleness of this disease. Some of the greatest trouble that I have had in St. Paul in the production of certified milk, is to make the old-style medical men realize the difference between certified and pasteurized milk, and yet when you get them right down to brass tacks, they will admit that there is only one kind of milk that is right for children, and that is, the clean raw product coming from healthy animals.

Gentlemen, this disease is enough to make every man stop and think, and I sincerely hope that if I have done nothing else today, I may have impressed upon you as veterinarians the terribleness of this disease and its danger to our breeding from a monetary standpoint, but above all, its danger to the human race, and especially to the children.

President Dunphy: Gentlemen, as much as we enjoy hearing from our friend D. D. Aitkin, I really think that the substitution was a good one, because we got the actual experience of a man that has been there. I am very much impressed with Senator Hackney's speech. I really think that he has given us something that will make us think more and more of the seriousness of the tuberculin test, and what it means, not only to the herds of the country, but to the human race.

Our next paper is by Kiernan of Washington, Report of Progress in Tuberculosis Control. That is the report of the progress that has been made by the states, as well as B. A. I., and interesting points in the control of tuberculosis.

REPORT OF PROGRESS IN TUBERCULOSIS CONTROL

By John A. Kiernan, Washington, D. C.

Two years ago our organization adopted the accredited herd plan on the recommendation of a joint committee representing the pure-bred cattle breeders' associations and the United States Live Stock Sanitary Association. At that time there were no federal accredited herds but there were some herds in that status in Minnesota, Illinois and Wisconsin, in which states such a plan had been in operation for a few years.

On December 1, 1918, one year after the adoption of the accredited herd plan, there were 204 accredited herds in the
United States with an aggregate of 5,743 cattle. On March 31, 1919, when herd list No. 2 was issued, there were 782 accredited herds representing 19,000 cattle. At that time there were, also, 6,535 herds with an aggregate of approximately 80,000 cattle which had passed one successful tuberculin test without reactors, in preparation for being accredited.

On this day, the second anniversary of the inauguration of the American accredited herd plan, there are 1,355 herds with a total of 35,204 cattle fully accredited and 12,838 herds representing a total of 191,428 cattle that have passed the initial successful test in their advancement to full certification.

While the data furnished gives a fair estimate of the progress of the work, it is a very feeble exposition of the sentiment of the live-stock owners of this nation relative to the tuberculosis problem. Two years ago the plan was launched and it was necessary to take up the inauguration of the work with every state. It was absolutely essential to start from the ground floor and build up state by state until today every state in the Union has accepted and adopted the plan and it is in actual operation in forty-five states. The number of accredited herds and herds which have passed one successful test represents only a portion of the total number of herds in the United States that are under supervision so that they may be accredited when they qualify. On November 15, 1919, there was a total of 17,096 herds representing 367,239 cattle, under state and federal supervision for the eradication of tuberculosis. We recognize that, while this is a fairly good showing it represents but a very minute portion of the total number of herds and the total cattle population of the United States, but in analyzing the work we are compelled to deduct that the herds now under supervision represent the most progressive breeders in practically all of the pure-bred cattle associations. Among some of the breeds practically every prominent herd is under supervision so, while the herds that have been attracted to the accredited herd plan are not extraordinary it is clearly demonstrated that the best breeders of cattle in America see in the system a practical plan by which they can present to the public the fact that their herds are free from tuberculosis.

One of the most disturbing features of the work at this time is our inability to keep pace with the demand for herd tests. On November 15, 1919, there were 3,233 herds waiting to receive the initial test. At the rate this list is being augmented it is reasonable to presume that by January 1, 1920, it will be
largely increased. Most unfortunately while the demand for accredited herd work was increasing it was found necessary to reduce the force of inspectors employed by the Bureau of Animal Industry on account of insufficient funds provided for operating expenses. The fund provided for the payment of indemnities has only been slightly drawn on because there are not now a sufficient number of inspectors to test cattle to make it possible to pay that amount of indemnity to the cattle owners for tuberculous animals. Paragraph 1 of the uniform methods and rules for accrediting herds of cattle provides that the test shall be made under the supervision of the Bureau of Animal Industry or a regularly employed veterinary inspector of the state in which co-operative tuberculosis eradication work is conducted. At this time there are in the neighborhood of 300 state and federal employes engaged full time in the eradication of tuberculosis. These forces are being gradually increased from month to month, and it is not without the realm of reason to anticipate that within a few years there will be more than a thousand employes devoting their entire time to the control of this great plague. Can satisfactory progress be made with such a combatant army of veterinarians? I say, most decisively, "No." We can clean up hundreds of herds in every state; we can clean up tens of counties throughout the United States; but there are tens of thousands of herds to be cleaned up and thousands of counties to be freed from tuberculosis before we can lay any claim to substantial progress in the eradication of the disease.

Our forces now are, and most necessarily would always be absolutely inadequate under the present plan of operation; that is, the employment only of official veterinarians in this work. But does the present plan represent all the ideas and conceptions of the necessity for conducting his campaign? It does not. It was never contemplated that satisfactory progress could be made in the eradication of tuberculosis by the employment only of state and federal officials whose entire time was devoted to the work of the respective governments by which they are employed. The scope of this work—its proportions—were duly recognized at the time the work was launched. Those in charge of the work recognized, from the first, the tremendous task undertaken and they well understood that, if satisfactory progress was to be made, every available competent person in the United States who could lend his assistance to the campaign must necessarily be enlisted as a co-operating force so that satisfactory progress might be made.
You have heard, perhaps, as we all have heard, that this tuberculosis-eradication work was "depriving some veterinarians of their bread and butter." In my mind there is a serious doubt whether I should speak such a phrase—and to a discreet mind, when doubt arises the subject of the doubt should be dismissed and not uttered. But this claim has been oft repeated, less often by practicing veterinarians than by would-be conservators of the perquisites of the private veterinarians—those intense, philanthropic individuals who are eternally vigilant to protect others from the wrath and inquisitions of an omnipresent evil, those valiant crusaders who with true chivalric spirit are searching everlastingly as Don Quixote was for opportunities to demonstrate their altruistic and indomitable courage and determination to right imaginary wrongs. No state has any license or desire to do the private veterinarian an injury, and far be it from the thought of the officials of the Bureau of Animal Industry to work any hardship upon them. The Bureau believes that the campaign for tuberculosis eradication that is now in progress will do more to improve the practice of the private veterinarians of the United States than any other work ever inaugurated, with the possible exception of the control of hog cholera. The private veterinarian must and will play a very important part in this campaign and it was intended from the very beginning of the work that in time he should be brought into active co-operation. As a true and substantial manifestation of the conception the Bureau has had of the part to be played by the private veterinarian, you are referred to the article on tuberculosis eradication read by the speaker at the meeting of this association one year ago. A plan was then outlined for turning over to the private veterinarian accredited herds which had officially been found free from tuberculosis. I have the honor to submit to you the following proposed plan for associating approved private veterinarians with the accredited herd plan:

1. When a herd has been officially accredited continuously by the United States Department of Agriculture and state for a period of two years, it may then be tuberculin tested annually by any veterinarian whose name is upon the accredited list of veterinarians approved of by the United States Bureau of Animal Industry, provided that before any veterinarian other than one who devotes his entire time to the work of any state or the Bureau of Animal Industry can be approved for accredited herd work, he shall have passed an examination conducted by the proper live-stock sanitary official of the state in which he resides, and the Bureau of Animal Industry. He then shall be eligible to conduct annual tuberculin tests upon herds which have been officially accredited upon dates approved of by the proper state live stock sanitary official.
and the inspector in charge of the Bureau of Animal Industry in the
state wherein the herd is located.

2. No herd test can be made by such an approved veterinarian unless
he has instructions in writing from the state official to that effect. The
dates of the annual tests for each herd shall be recorded in the state
office and, also, in the office of the inspector in charge. On any annual
test the state and bureau reserve the right to have a regularly employed
official present on the farm to supervise the testing done by the approved
veterinarian.

3. The approved veterinarian shall conduct each test strictly in ac-
cordance with instructions issued by the Bureau of Animal Industry to
employees engaged in co-operative tuberculosis eradication work. At
the conclusion of each test, the approved veterinarian shall submit to
the state veterinarian and the inspector in charge of the Bureau of Animal
Industry, a copy of the record of the test.

4. Any animal of a herd under supervision which may react in any
herd tuberculin tested by an approved veterinarian shall be marked for
the purpose of identification in accordance with the regulations of the.
state in which the animal is located.

5. Tuberculin tests applied by veterinarians other than those regularly
employed by the state and the Bureau of Animal Industry shall be
paid for by the owner of the herd, or by the state.

Regulation 7, the first Bureau regulation requiring the application
of the tuberculin test for cattle shipped interstate, provides
that practically all the testing shall be done by private veterin-
narians who have demonstrated that they are capable of making
tests, and at this time upward of six thousand private veterin-
narians are upon the list and have been furnished certificates by
the bureau to tuberculin test cattle under that regulation. Where
in all the annals of veterinary medicine has a more extensive,
a more comprehensive, and a more practical demonstration of
the desire of enlisting private veterinarians to supplement the
work of official veterinary organizations charged with the re-
sponsibility of controlling and eradicating infectious diseases,
ever been consummated? The Bureau has endeavored in that
way to enlist the services of every qualified veterinarian in
America in the campaign of tuberculosis eradication. It was not
a secondary thought that produced this existing plan. It was con-
ceived at the outset and carried into execution at the most propi-
tious moment. Some few people have conceived the idea that the
state veterinarians and the Bureau worked a gross injustice upon
them when in the accredited-herd plan they provided that tests
should be made only by official employees. The error in so con-
struing the preparation of that plan is that anybody designedly
left out the private veterinarian. The accredited herd plan pro-
vides that the test shall be made by a state or bureau employee. In
my judgment it is a wise provision. I do not think that there
would be any way to destroy and cast into ignominious oblivion the accredited-herd plan quicker than to permit herds to become accredited upon a test made by every individual, private practicing veterinarian in the United States.

To place the accredited-herd plan on the basis of a test by every veterinarian would be putting it in the same position as the interstate movement of cattle has been for ten years. Immediately there would spring up in practically every state the skepticism that has existed for years as to the reliability of the test—and where would the accredited herds be, if in one state there were a hundred herds upon the list that were absolutely ignored in ten other states? If State “A” had 100 herds and State “B” had 100 prospective purchasers of pure-bred cattle, but State “B” had no confidence in the reliability of the accredited herds in State “A”, what would it avail that state to have an accredited-herd list? Would it not be absolutely upon the same basis as the interstate movement of cattle has been for ten years? And would not these various states say—“we do not accept accredited herds from State ‘A’ or State ‘D’ or State ‘L.’ We do accept accredited herds from State ‘C’ and State ‘K’ under certain conditions and restrictions and interpretations. They may come into the state provided we retest them in sixty days.” Would that be an accredited-herd plan that you would be proud of, or that any state would take interest in, or any legislature appropriate money to maintain, or any breeder, any reliable and responsible breeder, take any pride in being a party to? In contrast to that condition which I think would exist if herds were accredited on the same basis as cattle were tested for interstate shipment for many years, is our accredited-herd system today containing more than 1,000 herds and representing many thousand cattle. After having the official approval of the U. S. Department of Agriculture and of every sovereign state in America an accredited herd may move from one state into another state at any time the owner desires to move it or any member of it without any additional tuberculin test. Furthermore, a member of an accredited herd or the entire herd itself may move from any state in the United States into the Dominion of Canada and the Argentine Republic or the Republic of Chile, and I daresay to every country in the world that will accept our cattle without any additional tuberculin test. These herds are tested annually and those that are accredited receive a certificate from the state and the United States Department of Agriculture which the owner may use to tell the world that, so far as human ingenuity and the best biological agencies that have so far been found can
detect the presence of tuberculosis, his herd is free from that disease.

Is there a person within the hearing of my voice that can find any reasonable complaint with a plan that can pick out of a chaotic condition the cattle industry of America and, within a period of two years, place it upon a pedestal that can withstand the darts of criticism? Can any person reasonably object to the accredited-herd plan that the live stock owners of America have endorsed and that practically every pure-bred association in America has gone on record by instructing their members and urging their members to place their herds on such list at the earliest possible date? It is a matter of great pride that the speaker is so fortunate as to be linked up with a work that has so much worth behind it that the breeders of America claim it as the greatest step ever undertaken in the control of tuberculosis. Shall the private veterinarian take a part in accredited-herd listing? Yes: he shall take a part equal to any person now engaged in that work provided he demonstrates that he is capable of doing the work, provided he demonstrates that he does the work in the same way as those engaged in it, and provided he does it in a businesslike way at the time it is intended that it shall be done. The live stock world cares little whether tuberculosis is eradicated by private veterinarians or officials of the states and federal government, but it is concerned in the conservation of its resources and it does not propose to permit tuberculosis to spread until practically all the herds—bovine and porcine—are infected. It has called the halt on the great white plague so far as it affects cattle and swine. It says, we believe, that when tuberculosis has advanced at the rate of 1 per cent per annum among the swine of America for the last ten years with prospects that it will continue to spread at an increasing rate unless checked we should be traitors to the nation if we did not make every endeavor to check the ravages of the disease at this time. It further says to the state live stock sanitary officials and to the U. S. Department of Agriculture: “Your organizations are charged with the responsibility for the control and eradication of infectious diseases of live stock and we hold you accountable for the progress that tuberculosis has made and the prospects of its further advancement. The burden is upon your organization to check its spread and we, with our organization, and through our individual efforts, are going to hold you strictly to account. If tuberculosis is an eradicable disease, you must eradicate it!” It strikes me that if we don’t eradicate it, some one else will get the job; through some other
organizations, state and federal, an effort will be made to exterminate tuberculosis. We have a tolerant people in this nation—easy-going, good-natured, willing to overlook mistakes, sympathetic and tolerant—but all these virtues have a limita-
tion and these same people when they make their minds up to do a thing never fail!

The accredited-herd plan has been endorsed by every pure-
bred cattle-breeding association in the United States and has been approved by practically every agricultural and live-stock journal in America. The plan is not perfect but it is reliable. It has withstood the test of time, and today it stands approved. That it can be improved here and there, there is no gainsaying, but the plan, if followed, will be the beacon light to guide the cattle industry of America in the eradication of tuberculosis. From time to time accredited herds will be found to contain tuberculous animals, and some owners will be disappointed, and may question its success, as some individuals question the skill of the surgeon, or the observations of the astronomer, or the reckoning of the mariner, or the astuteness of the statesman, or the ability of the lawyer, or the diagnosis of the physician, or the wisdom of the philosopher, or the accuracy of the scientist. The accredited-herd plan will make errors the same as flesh and blood and every plan devised by man. As the seed fails to germinate and the soil fails to function, and the tides overreach their normal ebb and flow, so will the accredited-herd plan fail to reach the acme of perfection; but if we veterinarians fulfill all our obligations, if we render to the accredited-herd plan and to the industry, with the health of which we are charged and have sworn to protect, the best services which we are capable of rendering, the accredited-herd plan will have so few errors charged against it that it will take its place among the human instruments devised by man for the perfection of man's worldly goods. If we co-operate with the same earnestness that the veterinary profession has co-operated in the extermination of other infectious diseases of the United States, the accredited-herd plan will have done more to raise the veterinary profession in the estimation of the live stock world and in the estimation of this nation and the nations of the world than any work it has ever undertaken. American veterinarians have assumed a great responsibility in undertaking to eradicate tuberculosis. They do it, not with the idea that it is an easy task, but that it is the most gigantic work ever assumed by them. Their aim is to eradicate tuberculosis from every pure-bred herd in America so that it may be on the accredited-herd list. In twenty
years from now what will be the status of a herd that is not accredited? Will it be necessary to have a discredited-herd list? The accredited-herd plan is worthy of the support of the individual veterinarian, of the county association, of the state veterinary association, and of the greatest veterinary association of the world—the American Veterinary Medical Association.

When an area is freed of tuberculosis how shall we protect it against the invasion of diseased animals? It must be admitted that, if an area is freed of tuberculosis, it would avail little to the residents of that area unless some means were devised for preventing the introduction of tuberculous animals. If a county such as Island County in the State of Washington, or the District of Columbia, eradicates tuberculosis from its cattle, is it asking too much to put such territory in a little different status from counties or states wherein it is known that the disease exists to a considerable degree? If Idaho or any other state is freed of bovine tuberculosis, should it be kept in the same status as another state wherein tuberculosis exists among 30 per cent of the cattle? Today we have a federal regulation requiring the tuberculin testing of cattle for interstate shipment. Would it be justice to the live stock owners of a tuberculosis-free Idaho, to the live stock owners of Island County, Washington, or to the live stock owners of the District of Columbia, to require that their cattle shall be tuberculin tested before their cattle will be allowed to move interstate when no tuberculosis exists within their confines? It is true that those territories—the county, the state and the district referred to—are comparatively small units; but there are other states representing more than one-half of the area of this country that are comparatively free from tuberculosis, and it is reasonable to expect that within the next ten years those states will be practically freed from the disease. Should we not be looking forward to the time when this area should be classed as free so that the movement of cattle interstate might be facilitated without any tuberculin test? Georgia now proposes to eradicate what little tuberculosis exists in the three northwestern counties of the state. What will it profit the owners in those three counties after they come through with the work and exterminate the disease, if they are required to have their cattle tested the same as cattle tested in states wherein the disease exists extensively? Starting at the Potomac River, going south to the Gulf of Mexico, and west to the California line, and going west from the Washington Monument, all that territory south of the Ohio River is comparatively free from tuberculosis: In addition to that, take—Ope-
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Oregon, Washington, Utah, Idaho, Montana, North Dakota, Wyoming, and Nevada, and possibly some others are compartmentally free from tuberculosis.

In all of that territory and within all the states enumerated, tuberculosis exists among the dairy herds recently established or herds of longer standing that were established with the seed foundation imported from other states. That is a very serious charge—that those states were free from tuberculosis until animals were imported into them from other states. The grounds upon which that statement is predicated is the experience of tuberculin testing all of the herds in that territory for a period of two years and the more extensive testing of herds in those respective states, under the supervision of the state veterinarians. You can go into the native herds where no importations have been made and where the animals have not come into contact with herds containing recent importations, and no tuberculosis is found. Can any person question for one moment the right and duty of a state official having such conditions to employ every possible restriction and regulation to keep the disease out of his state? Why, he has the unanimous support of the livestock industry and he has the resources, the entire resources, of his state—physical and financial—to back him up in freeing the territory of the disease. What is his reward and the reward of the people going to be when they do get rid of the disease? Shall they be required, whenever they desire to ship an animal interstate, to have it tuberculin tested the same as other states where the disease has obtained a stronghold? Would it not be sufficient for those herds to be annually tested or occasionally tested, and it will be necessary to test them to be certain that the disease does not exist.

I submit to you the recommendation that as rapidly as territory is freed of tuberculosis it be designated as free territory and that the movement of cattle from that territory interstate, except cattle under local quarantine, be permitted without restrictions so far as tuberculosis is concerned. In ten years we should have in the United States an area approaching more than 2,000,000 square miles that will be virtually free of the disease. This will represent, in round numbers, two-thirds of the total area of the United States. This may seem visionary to some but it is not any more speculative than was the program outlined in 1906 for the eradication of splenetic fever of cattle. You will recall that at that time there was quarantined on account of the existence of cattle tick more than 700,000 square miles of territory in this country. The plans in opera-
tion for the eradication of the tick when the work was inaugurated were the rotation of pastures and the mopping of infested cattle with the grease rag. Both methods were later supplanted by a more modern and approved method; namely, the dipping vat which is now in universal use in the extermination of that disease. The point I wish to make, however, is that in 1906 it was known that the cattle tick could be eradicated and the bureau proclaimed that it was engaged in a campaign to exterminate that parasite from more than 700,000 square miles of territory within the Union. The end of that campaign is in sight as it is contemplated that the work will be practically completed well within five years from this date. I grant that it is very much easier to exterminate the tick from an infested area than to eradicate tuberculosis from a herd, but we have knowledge and confidence born of experience that the latter disease can be exterminated from a herd and that hundreds of herds have been freed of tuberculosis. Accepting those facts, as we are compelled to, we have confidence that wherever and whenever an owner and the manager and other persons in care of a tuberculous herd earnestly determine to rid it of the disease and put into practice the same methods that have been tried and proved adequate, they will eventually succeed. It will be a difficult task but the effort will be crowned by victory when it is determinedly practiced. The responsibility for eradicating tuberculosis from individual herds rests upon the owners and persons in care of such herds. If they approach the problem without decision, without determination, and without carrying out all the practices that are absolutely essential for success, they will fail. If they leave in the herds tuberculous animals that are compromises of their own consciences, if they trifle with the results of the tuberculin test or any other reliable method of detecting the disease, they will fail. In every state today owners may obtain full instructions for eradicating tuberculosis.

The campaign is just in its infancy. No person can forecast the date when this great work will be completed—and it is unnecessary to make any estimate of how long it will take. It may be fifty years or a century before the end is in sight; but, what is a century if at the end of that brief space of time as compared with the ages that have passed and the time that is to come, the job is finished. If we pursue this campaign and it develops as it has progressed in the last two years, and we are working hand in hand, breeder with breeder, and veterinarian with veterinarian, there need be no apprehension as to
the ultimate outcome and as this generation relinquishes its responsibilities and they are assumed by their successors we need have no qualms of conscience as to the estimate they will have of our ability and sincerity and temerity to have engaged in this enterprise; and what richer heritage can we bestow upon our successors than the preservation of the live stock of this nation which has been entrusted into the care of the breeders and the veterinarians during their reign upon this earth. Therefore, let us strive to be true to ourselves and show by our deeds that we were worthy of the trust imposed in us.

PRESIDENT DUNPHY: Gentlemen, we have with us this afternoon Congressman Haugen, of Iowa, who is Chairman of the Agricultural Committee of the House of Representatives at Washington. I am going to call on him to address you for a few minutes, after which we will adjourn.

CONGRESSMAN HÄUGEN: Mr. Chairman, I infer from the remarks of the gentlemen who have preceded me that the topic of discussion is that of the eradication of tuberculosis, I think that is something that we can all come to an agreement about, and rally around. You all agree that this dread disease should be eradicated, and I believe that I can say for the Committee of the House, as well as of the Senate, that they are taking an interest in the work, their heart and soul is in the work. We shall be pleased to hear from you and to have suggestions how to most effectively eradicate the disease, and accomplish the results so much desired. You can be of great assistance to the committee, and I am sure that any suggestions that may come from you will be heartily received and given most careful and conscientious consideration.

THIRD SESSION
TUESDAY, DEC. 2.

The convention adjourned to Tuesday, December 2.

PRESIDENT DUNPHY: The first paper on the program this morning is by W. W. Wright of Illinois, superintendent of the Division of Animal Industry, on "Safe and Practical Regulations for Handling Feeder Hogs."

SAFE AND PRACTICAL REGULATIONS FOR HANDLING FEEDER HOGS

By W. W. Wright, Springfield, Ill.

My experience in sanitary work is not as extensive as most of you here, and what I say must not be considered as authoritative, but simply perhaps as suggestions coming from a man that is trying to acquaint himself with the conditions in the past few months, and coming from my observation and my ideas.

I don't know that I will make any special definite recommendation in regard to handling feeder hogs, but I will give
you my ideas along this line, and I am going to begin by talking about the matter of taking feeder hogs out of stockyards. I will give you some statistics on the hogs that have come into the state of Illinois from different yards.

I have attempted in the past few months to keep the record on the feeder hogs that have come into Illinois through our department at Springfield from various yards of the United States. When a load of feeder hogs is sold in any yard and comes into the state, we get a record of it at our office, and we ask the man that takes these hogs to his farm to be fed and finished for the market, to send us weekly reports for about four weeks, just a postal card, and on that we have a form, how many hogs died of cholera, how many hogs died from any other cause, what the cause is and so forth, and it is from such records that we have compiled these statistics.

During the period from July 1, 1918, to December 31, 1918, we took from the Union Stock Yards here in Chicago, 2,454 hogs. Our reports show that 104 of those hogs died of cholera, one of overheat, two killed from other causes, making a loss during that period of the total number of hogs that went into the state of Illinois from the Union Stock Yards of Chicago, 4.3 per cent.

From the National Stock Yards at St. Louis, during that same period, we sent into the state of Illinois feeder hogs to the number of 25,736. Of those 15 died in transit, 1 from overheat; 4 killed; 5 died from mixed infection; 35 from septicemia; 1 from pneumonia; 3 from thumps; 1 from fits; 3 from diarrhea; hog-cholera, 1,563; making a total loss during this period from those yards of 6.3 per cent.

From the Kansas City yards we shipped in during that period a total number of 39,185 hogs, 25 of which died in transit; pneumonia claimed 30; 2 were hurt and eventually died; 1 was burned; 2 were overheated; 2 died in castrating; 1 was smothered; 1 died from septicemia; and our report shows 1,533 dead from hog cholera, making the loss from the Kansas City yards during that period 4.07 per cent.

From the Indianapolis yards we received 1,720 hogs, 5 died in transit; 44 were supposed to die from cholera, making a loss from those yards of 2.8 per cent.

From Wichita, Kansas, we received 4,007 hogs; 1 died in transit; four were smothered; 78 died from cholera, making a loss from those yards of 2.7 per cent.
From Oklahoma City we received 5,239 hogs, 34 of which died in transit, 9 from mixed infection, 146 from cholera, making a loss of 3.6 per cent.

From Omaha we received during that period 242 hogs, 2 died in transit, making a loss of 0.8 of 1 per cent.

From St. Joseph, Missouri, we received 1,891 hogs; 3 died in transit, and 20 died of hog cholera, a loss of 1.05 per cent.

From St. Paul we received 3,971 hogs, 18 of which died in transit, 87 from hog cholera, making a loss of 2.7 per cent.

From Fort Worth, Texas, 632 hogs; 2 died in transit, 20 from cholera, making a loss of 3.5 per cent.

Now there is the showing for the period from July 1, 1918, to December 31, 1918, in the yards that I have mentioned. I don't want anybody to get an idea that that per cent will hang steady over any like period of time in any one of these yards. The per cent will vary according to the number of hogs received from each yard over a certain period. Sometimes we receive a large number of hogs, more hogs may die, but yet the per cent be less over that same period.

During the period beginning January 1, 1919, and ending June 30, 1919, there were shipped from Chicago 4,102 hogs. Died from cholera, 75; in transit, 3; killed, 10; septicemia, 1, making a loss of 2.1 per cent. You will note an improvement in the Chicago market. During the six months previous the loss was 4.3 per cent on almost half as many hogs. During the six months last referred to the loss was cut in two, and the number of hogs taken out was twice as large, showing quite an improvement at the Union Stock Yards here at Chicago.

From the National Stock Yards of St. Louis we took out during this period 17,105 hogs. Died of cholera, 1,303; in transit, 34; pneumonia, 2; loss, 7.08 per cent.

From Kansas City we received 17,807 hogs, of which 1,046 died of cholera; 19 from mixed infection; died in transit, 29; attributed to dipping, 2; died of pneumonia, 3, and died from other sickness, 69; loss, 6.5 per cent.

From Indianapolis we only received 306 hogs during that period, of which 13 died, making a loss of 3.5 per cent.

From Wichita, Kansas, we only received 301 hogs, of which 31 died, making a loss of 11.9 per cent.

From Oklahoma City we received 1,409 hogs during this period; 51 died from hog cholera, 1 from other sickness, making a loss of 3.6 per cent.
From St. Joseph yards we received 581 hogs, 78 of which died of hog cholera, 1 in transit, making a loss of 13.5 per cent.

From the St. Paul yards we received 2,081 hogs; 27 died of cholera, 6 died in transit, 11 were killed, and 1 died of thumps, making a loss of 2.15 per cent.

Our loss from the Fort Worth yards during this period was .39 per cent. From Louisville, Ky., our loss was 2.3 per cent. From Nashville, Tenn., it was 2.5 per cent. From Danville, Ill., our loss was 2.47 per cent. From Detroit, Mich., 1.5 per cent on 568 hogs.

If anybody can tell anything definite from the figures I have given there absolutely they can do better than I can. These figures will vary, as I intimated before, over any given period of time according to the different conditions.

I am not sure that I know just what to think about taking hogs out of public stockyards. We began this thing a year or two ago when the farmers were sending into the yards to get hogs to feed our boys that were fighting over in Europe. We began plans to take these hogs out of stockyards and do it safely, and we advised sanitary officials all over the country. You men I suppose were the ones actually responsible for that plan, you were the men that helped do this, you are the men that are watching this work and trying to control disease in hogs, and you know what happened. You know you have all had about the same experience in Illinois. In the past two years I have visited several of the yards mentioned. I have seen the boys treating these hogs; I have seen them dip them, spraying and disinfecting them, and shipping them out, and I could not suggest anything that could be done further, but as long as hogs are taken from public yards there will be some risk and some danger of disease. These hogs are shipped into the stockyards in cars that have from two to six inches of filth all over the bottom, containing, I presume, the germs of almost every disease. They come into public stockyards that are full of germs. Then they are sold and are sprayed and cleaned up to the best of our ability. They are put in clean, disinfected cars and sent back to the farm, and unloaded through chutes into some little country stockyards that perhaps has not been disinfected for the last five years, and then they go into a feed lot.

Now, I don't know as there is anything more that it is humanly possible to do to make matters better. If a man can handle hogs in this way on from a three per cent loss down.
under ordinary circumstances, he will be able to make some money—and the farmer is demanding these hogs.

This feeder demand has grown immensely. In every community through the middle West there is a demand for these feeder hogs. The farmers demand that we keep a way open whereby they can go to the market and buy these hogs. The tendency is to buy more feeder hogs just as we buy steers.

I would prefer to go to the country to buy feeder hogs. I believe that the South has a wonderful opportunity in raising hogs for the corn belt to feed, but I believe that those hogs should be moved in such a way as to minimize the danger of exposure to contagious disease.

I remember once listening to a paper read by Dr. John Beer, on contagious diseases, soon after we had the last hoof-and-mouth attack, and I was very forcibly struck by a statement he made as to how very materially contagious disease had fallen off, especially in the matter of shipping, in horses after they began to clean up cars. We have had a little experience in cleaning up these cars, and we know enough to know that it is a very good thing.

In my opinion the time is coming when live stock must be cleaned and disinfected.

In my own little town several of my neighbors, including myself, attended a sale of shorthorn cattle held in Galesburg. The crowd purchased four bulls—and when they arrived they were in a dirty car. Every bull but one was sick. In my opinion, they picked up a sort of influenza in the stockyards.

It may be possible that these hogs that die have been exposed prior to the time they arrived at the yards. They may not have shown temperature at the time they were vaccinated, but it may have developed later, and caused some of the loss.

I don't know that it is wise to spray these hogs in the winter time. Hogs are very susceptible to pneumonia, and to spray them and send them right out in these cars, seems a little dangerous to me, but we have this proposition on our hands. We have the farmers demanding feeder hogs, and gentlemen, it is up to the sanitarians of the country, and the scientists, to find a way that these hogs can be moved to these farms for feeding purposes, and minimize the danger of loss from contagious diseases.

President Dunphy: This is an important proposition, it is a great conservation proposition, because many companies and many individuals are buying hogs in this way to feed up the garbage that would
otherwise be wasted. It is an important problem and I think it wise for us to look into it, and discuss the matter. If anyone has any suggestion that would aid in making the percentage of animals that die from cholera after leaving the yards less, let us have it right away.

DR. LUCKEY: Mr. Chairman, this is a very important proposition, and I believe there is a way to improve this stock hog traffic.

Just a few years ago this vaccination at the yards was ostensibly under federal supervision. It is a fact that the speculator who sold the hogs had a right to choose his own veterinarian to take the temperature of these hogs, and I have very reliable information to the effect that in East St. Louis hogs with red bellies, showing 106°F, were passed on the day vaccinated and sent to the country. I know that we received them in the state, badly affected with cholera, with large losses out of a carload, as much as 40 to 45 head.

There is not sufficient authority given to those who are responsible to eliminate incompetent or careless people in temperaturing these animals. Then, the rule was laid down that any serum made under a government license could be used, no question about it, regardless of whether the hogs all died at destination, an ironclad rule that a government license opened the way. We had a little set-to-on that proposition in Kansas City, and it was finally decided that we would permit the use of any serum coming out under government license, although we knew certain firms that were producing very impotent serum, which bore the government license, and there was a lot of serum sold bearing a government license which was impotent.

The C. Rhea incident at Kansas City is a striking illustration. I understand now that another firm has been hauled on the carpet, and I know firms manufacturing under a government license who are regularly and consistently, and have been for a number of years, putting out serum that is not good, and I understand there is a rumor now that some of these firms working under a government license have been plugging their test pigs and reinforcing them with a little serum of another kind, so the serum would test sound.

We must get away from the idea that a government license means that that serum is potent, because we know that there is plenty of serum with a government license that is not potent, and the authorities of the various states and the Federal Government must apply a little more latitude in order to eliminate the use of bad serum.

It is a very striking fact that the records show that practically all of the heavy losses, for instance, out of Kansas City, have followed vaccination with serum under one license number. Hogs coming to Missouri from East St. Louis, practically all of the heavy losses from East St. Louis, are vaccinated with serum under one government license. The heavy losses from Wichita and Oklahoma, vaccinated with a certain license number, show heavy losses. Are we going to stand on this rule that the government is infallible, and a government license is the whole thing, or are we going to stand on the proposition that we would like to have live hogs instead of dead ones for these farmers?

We have kept a record of all of the shipments unloaded in the state during the past year, and when the year is up, I propose to produce some figures on results. As I look down a certain column, number of dead at the end of 21 days, with a heavy loss, I can
almost see the license number without looking, for it, because I know with reasonable certainty where the serum was used. So with all due respect to the Federal Government on the supervision of temperature, we have got to take some further action if we make a success of stock hog buying out of public markets.

Mr. Wright spoke about shipments from St. Joseph to Illinois with a loss of 13 per cent. I think St. Joseph, Missouri, comes as near being the ideal dumping ground for fake serum and impotent serum as any place that I know of.

We have these hogs examined at least twice after arrival at destination. They are counted and we know the exact number, and we have a rule established that we will not approve the serum of any serum company when it proves to be no good, and I think you will find that shipments from St. Joseph into the state of Missouri will not show anything like 13 per cent loss, and I believe that that is the reason.

If the authorities of the state of Illinois will back me up and not receive hogs vaccinated with serum that we know is impotent, I will put the rule into force and stop those shipments into Illinois. Dr. Spencer reports to me that it is coming, the same condition is arising in Nebraska, and we will have to eliminate serum that is impotent, just as fast as we can do so.

Alongside of these heavy losses I find carload after carload which show none, 2, 1, 3, cause of loss accident, injury, pneumonia, and from that I am led to believe that if we will exercise some authority and take charge of this vaccination, instead of letting the serum companies and their veterinarians run this thing, that we can get these hogs out of public markets in a lot better condition, with less loss to the purchaser.

DR. BIRCH: Mr. President, I think we are all very glad to find out that there is just one company that is producing bad serum under a license. Dr. Luckey makes the statement that he can tell from the losses just what that license number will be. Now, if we can corner it down that close, I believe that a solution ought to be arrived at very quickly. I am afraid though that it will be a little more complicated than we might think.

I would like to ask Mr. Wright one or two questions. One is how these hogs are treated in the yards: the other is if he has any records in relation to the number of new herd infections due to these shipments.

PRESIDENT DUNPHY: I believe Mr. Wright has left the room, but I will call upon Dr. Peters to answer that question.

DR. PETERS: Mr. President, I have not the data just offhand. However, I will say that there is a considerable loss from infection. As to how large a loss I could not say offhand. I believe that Dr. McDonald has the figures in hand very much better than I have, as he has charge of hog cholera work, in this state, and if he is here he can give that probably more correctly than I can.

PRESIDENT DUNPHY: Will Dr. James McDonald please answer this question.

DR. MCDONALD: We have not a complete record on that.

DR. A. W. MILLER: Mr. President, I feel that Dr. Luckey has made certain charges here today that should not be overlooked. The
situation at Kansas City that has been brought out, we, of course, in the Bureau, are familiar with. The way that Dr. Luckey has presented this proposition to you, I do not believe that he has drawn the line between this outside situation and the situation in the yards. The inference that I fear Dr. Luckey has conveyed is that the Bureau of Animal Industry is responsible for all the immunization at the Kansas City stockyards. This is not a fact. The bulk of the hogs, in fact until within two years ago, practically all of the hogs that moved from Kansas were not immunized under Bureau supervision. I know that a number of shipments that went out of there had heavy losses, but the Bureau had absolutely nothing to do with those animals. They were moved from the Kansas City stockyards into Kansas. The hog-yards, I might state, are nearly all located in Kansas City, Kansas, and that was an intrastate movement. After they reached these outside yards in Kansas, they were handled as Dr. Luckey states, but the Bureau of Animal Industry was in no way responsible for that condition.

Now, Dr. Luckey stated that our men did not have authority at the stockyards. They have ample authority, they have all the authority that they need, and if Dr. Luckey will point out one case where our men are not carrying out instructions, the Bureau will see that the situation is changed immediately.

There is one other point that I cannot agree with Dr. Luckey on, and that is that certain serum companies that have a government license are turning out uniformly impotent serum. It seems to me that that is an impossibility, as the serum is handled at the present time under the supervision of Bureau employes. It is possible, of course, that some batch of serum might be impotent, but I cannot concede that all the serum that an establishment, licensed by the government, is turning out is impotent, or that 50 per cent, or even 25 per cent is impotent.

Another situation that was referred to is the one at St. Joseph. I believe that Mr. Wright has left the room, and I did not catch those figures that there was a loss of 13 per cent in the animals from St. Joseph. Possibly that is right, but our statistics on the movement of St. Joseph hogs to all the various states show a loss of less than five per cent, and on all the animals that went from public stockyards last year on which we received reports, the loss was approximately four per cent.

We had shipments from public stockyards immunized under the Bureau supervision, totaling 614,000. We received reports on about 400,000 of those animals, with a loss of about 16,000.

One fact that I want to bring out, or rather, the assertion that Dr. Luckey made, that I want to dispute is, that the serum companies are supervising the immunization of swine in public stockyards. There is absolutely not a word of truth to that. The Bureau of Animal Industry is handling immunization of swine at public stockyards, and they are handling it independently of any serum company. I do not believe that Dr. Luckey is able to bring in any evidence here that our men are catering in any way to any of the serum companies. If he has that evidence, I would like to have him produce it.

DR. GIPSON: Mr. President, it seems to me in this discussion it would be well to find out if we can, where the weak point in this
method of handling stock hogs lies. The percentage of loss reported here this morning is higher than we were able to get while I was looking after that work in the state of Iowa. We figured that our 30-day reports showed approximately 2 per cent loss in stock hogs, and I think a two or even a three per cent loss covering shipment and vaccination combined is a very moderate loss, one that the farmer can stand.

St. Joseph has been pointed out here as a bad spot. Why is St. Joseph a bad market to send your client to to buy these stock hogs? In my opinion the weakness of the St. Joseph proposition is that they spend anywhere from a week to ten days or two weeks collecting a load of stock hogs in those yards. I have recommended to Iowa feeders to pass up St. Joseph for that very reason, and I have always counseled these men, if possible, to see that the hogs bought come in the same day, leave the next day, and are vaccinated promptly.

Now about the shipments, we have looked up the history of these shipments, and in many cases found that a number of hogs while being held were culled out of the shipments, and I have advised feeders that if they find quite a number of hogs being culled out of a bunch they expect to buy, they had better pass that bunch up.

I would not be surprised if Dr. Luckey is right—he is sometimes right, quite often—when he says red-bellied hogs have gotten by in some instances that should not have. If there is one real weakness in Amendment 3 to B. A. I. 245, it is that it permits hogs to be handled under that order that have been five days in public stockyards. I think three days is plenty long enough. The order if properly carried out, will give good results to the swine feeders of the corn belt area. If we can devise ways and means that the farmers who raise the corn crop can get hogs to feed this corn to with a loss not exceeding that attending the handling of cattle, we can insure success for the farmer if we can get stock hogs for him and get them to him safely.

We have had bad results in Iowa from shipments that remained in the yards for three days after vaccination, notwithstanding our adoption of B. A. I. Number 245, Amendment 3, and in addition required that hogs must be shipped in twenty-four hours after vaccination. We thought that was an improvement to the order. I have often wished that they would bar hogs that remained as long as five days in a public yard before being treated.

Business in these deals in stock hogs is unfair. I know men in Iowa who went out and ordered hogs, and it was left somewhat to the discretion of the commission firm as to whether they would send an additional carload of hogs, a third carload. They did send him a third carload, and he had a bad loss in that carload, and I learned afterwards that they culled nineteen hogs out of that shipment.

The fact that these nineteen hogs were not fit to ship would indicate, probably, to most of you gentlemen that some of the rest of them were not fit to ship. There was another iniquity connected with this sale of hogs. The buyer had a loss in this instance of nineteen hogs which were salvage, and he got out of that just whatever came out of them, but he paid the market price for the hogs, and did not get what he bought.
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I don't think when a feeder goes to any of these yards to buy hogs on this plan, under this rule, that he should be required to pay for hogs that are not fit to ship, that are not in condition to vaccinate and ship. I think it is an unfair proposition. It is just as unfair as selling rotten apples at the price of good ones.

There is nothing this organization can do that will bring more credit upon it than to devise a safe and just means for the handling of stock hogs.

I must say that the figures given this morning were somewhat of a surprise to me, because our experience in Iowa does not show the serious losses that are reported here; and I think it has been thoroughly demonstrated that a 30-day quarantine period is short enough.

Dr. Luckey: Mr. President, I did not intend to say that any serum company uniformly put out bad serum. I say, regularly, and when I say regularly, I say that during the years 1917, 1918 and 1919, three years in succession, hogs vaccinated both at stockyards and in other places with a certain serum, under a certain number, herds have been shot to pieces, and that is because that particular firm's serum was not good. I did not say one serum company. I said one at Kansas City and one at East St. Louis, and I might say nearly all at St. Joseph. I can point to losses as high as 75 head out of a carload, and other carloads with 14, 18, 25 and 40.

I want to ask the gentleman who questioned my statement whether he has the authority to prove that the serum used on these hogs that were dying at destination was efficient? I presume that if half the carload had not been immune already, they would all have been lost. I can give you the names and addresses of the owners. I can give you the license number, and it runs consistently right along with a certain license number, and I am going to use my authority to eliminate the serum which is producing this loss.

Mr. Mercer: (Kansas) Mr. President, I am sorry I was not here at the beginning of this discussion. I have had probably as much to do with the stock hog business out in our country as anyone, and I am rather surprised to hear Dr. Luckey say that we should eliminate impotent serum, or rather prohibit the sale of serum of manufacturers that are not reliable. I think that that depends upon Dr. Luckey himself, or the state of Missouri. If the law of Missouri is not sufficient to permit an embargo against the sale of serum in the state that is not potent, then his sanitary law is weak and needs strengthening.

So far as the Kansas City situation is concerned, I am in close touch with it, and I am having a lot of trouble down there with the stockyards. They want to handle the whole situation, and we don't want them to handle it. It is a proposition of the Kansas Sanitary Department, and this little imaginary line between the states of Kansas and Missouri running through the stockyards makes it a very disagreeable proposition for both sides.

I want to say that from my observation of the success of serum, not only in stockyards, but all over the country, it has been the one great factor in the elimination of hog cholera from the country and it has been the means of bringing about an educational feature that has taught the producer how to handle the hogs, to treat them,
to take care of them. There have been lamentable losses, not only in herds on the farm, but herds shipped from the stockyards, and so far as our records go, this year the success at the Kansas City stockyards and the Wichita stockyards has been remarkable. But few hogs have been shipped or permitted to move out of the Kansas City stockyards that have not been vaccinated under government supervision during the year 1919. I don't think that these people are shipping their hogs anywhere without authority and permission of the state to which they are consigned.

So far as our records go, we have not kept records of interstate shipments, but I have kept them within our own state, and the records show that the shipments from Wichita and Kansas City stockyards into the state of Kansas were less than two per cent loss during the year 1919.

There are a lot of things that entered into this, and I think that Dr. Gibson brought out a splendid idea as to the time. Every car of hogs that I know that was shipped out of the Kansas City or Wichita stockyards this year consisted of hogs gathered up around the yards, and probably some of them had been there ten or fifteen days, vaccinated and shipped to the country. They were not shipped out under federal supervision, because they were not interstate, and the government was not called on to supervise them, but we have had considerable loss. Out of 102 there were 32 died, and we traced the serum that was used in vaccinating these hogs, the serial number of it, to the various offices—or the government did, without any bad reports from any place where this serum was used. Therefore it could not be attributed to the serum. It was attributed to the fact that the hogs no doubt were in a sick, debilitated, bad condition before moving from the yards or before they were shipped.

I think it is a splendid requirement, in fact we will have it in our state—that no hogs can be moved from the yards that are known to have been there to exceed three days. It is a well-known fact to every shipper or producer, that in a good many instances where there is an outbreak of cholera in a community or in the country adjoining, a shipper ships his hogs to market. They may be healthy in appearance, but they are infected, and the serum does not produce the beneficial results that it would on a herd that had not been infected or exposed.

I say that it is not good policy to bring up the question of the serum, because we have had tremendous losses, and the serum proposition has only been built up in the past few years, and so far as our section of the country is concerned, we are not losing one hog now by reason of cholera where we formerly lost 200. That is a pretty broad statement.

If Dr. Luckey knows of any serum—if I did—I would give the number here and tell who made it. If I knew of any serum company that was making serum that was not right, I most assuredly would tell who that serum company was, and see if they could possibly be put out of business, and they ought to be put out of business.

As to the proposition that Dr. Gibson raised as to the salvage of hogs, that the commercial side, and of course I don't know that we can do anything only pass a resolution condemning such acts.
The same thing applies, the same rule applies to the tuberculin test. I think there should be a change in the rules at all these markets, either by the laws of the states or by mutual agreement among the directors of the yards, but the rule can be condemned by this resolution.

There has been marked progress in the elimination of the diseases of hogs in the United States in the last three to five years, and it can be all attributed to the benefits derived from serum. I am not as strong for all of your bacterins and things of that kind, but I certainly am strong for hog cholera serum, because I know what it has done. I think the use of serum and the educational features in the development of it have resulted in pretty nearly eliminating hog cholera from the farm.

So far as government supervision is concerned, so far as I know, and I am in close touch with it, at Kansas City and Wichita, has been most helpful.

As to the stockyards doing this work, I say it is not a stockyards function. They have no business to do anything but furnish the facilities.

I believe that the proposition is to look to the future and not to the past as to the happenings in the use of serum. Crude methods were devised in the beginning, and there were a lot of things done—I know I did things myself—that were injurious, but that time has passed, but what was done was done with good intentions.

The marketing of stock hogs at public markets all over the country and the centralizing the hogs there for distribution and sale has been marvelous, and in my judgment it is a success.

Dr. Peters: Mr. President, I believe this is a very important subject. As regards the St. Joseph yards, I believe that percentage is high, but I do not think it amounts to much, because the animals sent in from St. Joseph were less than 400 head. I know from experience in looking up this situation that a certain number of hogs die at destination. Dr. Gibson came near giving you the real cause why we have losses at destination, and that a portion of these losses is due largely to the fact that a number of feeders personally purchasing hogs at various yards will take a chance, and sometimes to my personal knowledge they knew they were buying hogs that were slow.

For the past two years, since the order has been in effect, we have been warning all feeders against purchasing animals that have been in the yards any length of time, and to try to get the hogs out of the yards as soon as possible, and when we can get that co-operation from the purchaser, from the commission men, from the yards, we will largely reduce losses, regardless of what serum is used, and in addition to that, when we secure clean cars to ship these animals to market and then back to the farm, we will again reduce the loss considerably.

I would like to see a committee appointed by this organization of three or five men, and ask the National Swine Breeders to appoint a like committee to work with this organization and work out some plan, and make a recommendation to this organization next year.

Secretary Campbell: Mr. President, in view of the length of the
program that we have hardly touched as yet. I move the discussion close.

Motion duly seconded and carried.

PRESIDENT DUNPHY: There is a matter of business to be taken up just now before we call for any papers, and that is the reception of members who have been proposed for this association. This was not taken up yesterday, and I think at this present time we had better dispose of that, as there are other members probably who will have to be taken in later.

SECRETARY CAMPBELL: It is necessary for the names of applicants for membership to be read, and then the applications referred either to the Credentials or the Executive Committee, depending upon the wish of the association. There has been distributed to the members a list of 189 applicants, printed, and I hope that may be accepted without reading them.

I move that those names be received and referred to the Executive Committee for their recommendation.

Motion duly seconded and carried.

SECRETARY CAMPBELL: I wish to say there are more than one hundred people who have signed the register as visitors; their presence here indicates their interest in live stock and sanitary work, and we would be pleased to have their applications for membership.

PRESIDENT DUNPHY: I might say that each member gets a report of the meeting containing all the papers and discussions of the meeting in our annual report. It is bound in cloth, and is really a book that ought to be in every sanitarian's, and every veterinarian's library.

The next paper is by Mr. W. J. Carnicheal, Secretary of the American Swine Breeders' Association, on "Regulations for the Interstate Shipment of Swine in Crates."

REGULATIONS FOR INTERSTATE SHIPMENT OF SWINE IN CRATES

By W. J. Carnicheal, Chicago

The National Swine Breeders' Association, which I am representing at the present time, is very much interested in the regulations or rules or anything which you may put in effect which will help or hinder the progress of the breeding of pure-bred hogs. We are interested in anything which furthers that progress. We want to get back of it. We are interested in things which will hinder that progress and we want to try to get away from anything which will hinder the continuance of the growth of the pure-bred hog industry.

We realize, of course, that the percentage of pure-bred registered hogs in the country is very small; in fact, during the calendar year 1918 there were less than a third of a million hogs recorded on the books of the various swine record associations. According to the estimates of the Department of
Agriculture, we had somewhat over 75,000,000 hogs on the farms January 1, 1919. Comparing the number of hogs recorded last year and the number of hogs on the farm at the first of this year, we find that there were less than one-half of one per cent of the total number of hogs in the country registered on the books of the various associations.

Going back a little, we find that there have only been about three million hogs recorded since the first record association was organized in 1875, that is, but three and a half per cent of the total number of hogs which we had January 1 last. Of course, there are a good many pigs, descendants from these animals which have never been recorded; in fact, there are hundreds of thousands of pure-bred pigs eligible to registry which are not recorded each year.

If we assume that one-half of the pigs which were recorded last year were males, that would leave something like one boar pig for every 200 head of hogs in the country, so it can be clearly seen that we do not have enough pure-bred boars to go all the way around, and as a result of this shortage in stock we find that there is an enormous traffic intrastate and interstate in pure-bred hogs.

The majority of these hogs are shipped in crates by express, and we are interested in seeing regulations in effect which will make it comparatively easy for a man who has a healthy herd of hogs to ship those hogs into any state in the union.

I believe that you all have in your hands at this time copies of this little tabulation which we have prepared. There are probably some errors in it. However, I have gone over it as carefully as I could, and have tried to get everything correct as reported to me directly from each state veterinarian, or sanitary officer in charge of the work in the several states.

If you will glance over this you will find that there is a wide difference in the requirements of the different states. This wide difference is very confusing to the hog man who is planning to sell and ship to the various states. It is confusing, because he may carry on his operations within his herd to the best of his knowledge and belief, and he may sell hogs to go to certain states, and find at the time that he goes to ship them that it is absolutely impossible for him to ship them except subject to certain regulations.

For instance, take a man who plans to use the double treatment on all of his hogs—there are two states; I believe, which will not accept any hogs which have had double treatment.
### U. S. LIVE STOCK ASSOCIATION

#### STATE REQUIREMENTS 1919

**For Interstate Shipment of Breeding Hogs in Crates by Express**

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<tr>
<th>STATE</th>
<th>CERTIFICATES REQUIRED</th>
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- **NOTES:**
  - *SHIPS MUST HAVE CERTIFICATE OF HEALTH*
  - D - AFTER HEALTH CERTIFICATE OR WITHOUT
  - E - TO BE SHIPPED DURING CERTIFICATE
  - F - TO BE SHIPPED DURING CERTIFICATE
  - G - TO BE SHIPPED DURING CERTIFICATE
  - H - AFTER HEALTH CERTIFICATE OR WITHOUT
  - I - TO BE SHIPPED DURING CERTIFICATE
  - J - TO BE SHIPPED DURING CERTIFICATE
  - K - AFTER HEALTH CERTIFICATE OR WITHOUT
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Glance over the tabulation carefully, and I want to call your attention to some of the differences which exist.

Under the heading, "Certificates Necessary," we have a column of those that require none. I believe there are 12 states that do not require certificates of any kind. There are 13 states which require a veterinarian's health certificate. There are 17 states which will accept hogs on the affidavit of owner.

There are 8 states which will accept hogs on the affidavit of owner, provided that affidavit is properly endorsed by a veterinarian. In some cases it is simply a veterinarian. In other cases, it is the assistant state or state veterinarian.

There are three states which under certain conditions require that a permit to ship into that state be obtained in advance of the shipment.

There are 12 states which require no definite number of copies of the certificate or affidavit. Three states require one copy; 17 states require two copies, and 15 states require 3 copies.

Then there is a considerable difference in the disposition of those copies. Suppose Mr. Breeder has the requisite number of copies made, he must know where to make disposition of those copies. One or two, I believe, where one copy is required, must accompany the way bill or bill of lading. If two are required, the second one must be sent to the state veterinarian or sanitary officer of the state of destination. The third copy, if required, is usually required to be sent to the state veterinarian of the state of origin.

As to immunization, we find quite a difference as to the requirements. There are 36 states which leave immunization optional with the owner. There are in some cases certain conditions which he must meet as regards immunization, provided he chooses to immunize. I will take those up in a moment.

There are two states which require the single treatment. There are ten states which require immunization, but will accept either single or double treatment.

You will notice in the column headed, "Days prior to the shipment double treatment must have been given, if used," that there is some variations.

Alabama, I believe, requires that double treatment must have been given 21 days prior to the time the hogs were shipped; whereas Kentucky, according to the information which we have,
U. S. LIVE STOCK ASSOCIATION

will accept shipments within 14 days after immunization. Others require 28 and 31.

As to the number of days within which shipment must be made after the single treatment, if that has been used, we find considerable variation. Kentucky will accept them within five days after they have been singly treated. Utah will accept them any time within sixty days after they have been singly treated. We find variations in between those figures.

As to the freedom from disease, some states do not make any specific requirement as to freedom from disease, or freedom from disease within any definite length of time, or within any definite distance from the farm.

I believe that the most drastic requirement in this respect is that which we have listed here for Oregon, in that they require that the herd, and not only the herd, but the territory within a radius of twenty miles must have been free from contagious or infectious disease for a period of six months, and we find variations running from there on down.

Some states require that the hogs be dipped or disinfected. Three states require dipping if hogs have been double treated. A number of states require that the crates be disinfected. Others make no requirement on this particular point.

I am presenting this matter to you, today, so that if you will imagine yourself in the position of the breeder you can see just how he may feel. Take a breeder out in the country with a small express station, who sells a hog to go into a certain state. He goes to the express agent and asks him under what conditions he will accept a hog for shipment to that specific state. The agent looks back through his tariff, and I believe that the latest tariff which he will have covering the point—at least the latest one which I have been able to get from the American Railway Express, is dated along in the middle of the summer in 1917.

I believe that a report was given to this body at your last annual meeting in which it was pointed out that something like 41 per cent of the states had changed their requirements in the year previous, in the twelve months previous to that time. None of those changes would be listed in that express tariff. I realize that you cannot compel the American Railway Express Company or anybody else to publish these rules and keep them up to date. I have taken the matter up with the express people and they said that they would gladly publish a new tariff any time
if they can get the information through us, and can get it out accurately.

Let us go back to this farmer. He gets a regulation two years old. The chances are a little better than two to one at the present time that it is wrong. At any rate, that is the best he can get. Even the express agent is not always able to read the regulations and interpret them properly; in fact, I must say that I had considerable difficulty myself in interpreting regulations from some of the states. I believe there was one state in which I had so much difficulty that I wrote eight letters to the state veterinarian, and I have those eight letters on file, and after getting eight letters I am absolutely unable to say with certainty what the regulations are in that given state. I do not know what the express agent is going to do nor what the farmer is going to do. The farmer went to the express office and asked for the regulation for the shipment into either Virginia or West Virginia, I have forgotten which, and there was something there about inspection must be made thirty days prior to the shipment, and he was at the express office with his hog in a crate, and this report had to be made, according to this rule, 30 days prior to the shipment.

Come to run it down, that requirement is not in force at all in that particular case, but the man had to spend something like fourteen dollars in telegrams before he could finally find out that he could ship that hog without having it inspected and reported on thirty days prior to the time he wanted to ship.

In going over the report of this association for the year 1917, I note on page 138 a report of the Committee on Affidavits of Owners versus Veterinarian Certificates. The report is as follows:

"That the interstate shipment of pure-bred swine by express in crates be permitted when accompanied by an affidavit of the owner to the effect that said swine to the best of his knowledge and belief are not affected with cholera and that cholera has not existed upon the premises from which said swine have been removed, for a period of not less than three months immediately prior to date of shipment. Also that such swine have not been subjected to the serum and virus treatment within thirty days immediately prior to the date of shipment."

I am not here asking that that be enforced or that that be adopted in the several states. What we would like to see is a fair, just and uniform regulation, whatever that regulation may be. If it is to the best interest of the hog industry in the
several states, to require a health certificate by veterinarian, all
well and good. If the affidavit of the owner will satisfy and
be all that it should, let that go. If the affidavit of the owner,
countersigned by a veterinarian will do the business, we are
in favor of it, but we would like to see something done to make
the regulations somewhat more uniform.

I realize that this body cannot do this in a minute. A num-
ber of the states, as you will note in the second column, and
as you well know, have statutory requirements. You can't go
out with your thumb to erase those requirements. Other states
have sanitary regulations. Those can be changed with less diffi-
culty if it is desirable.

I believe that similar differences exist in the requirements of
the various states covering the shipments of various classes of
live stock. It does not seem to me that there is any reason
why one state in the corn belt should have a very rigid require-
ment in one direction and another state have absolutely none.
Some people, of course, think that it is the right of each state,
to adopt such rules and regulations as it may see fit. That is
permitted, of course. But it is the abuse of a thing of that
kind, which causes a lot of trouble. I know of a number of
shipments of hogs which have been held up, simply because the
man did not seem to be able to get the information—certainly
could not get it from his express agent. The hogs went part
of the way, and were held up, delayed several days in transit
on account of a misunderstanding or misinformation as to the
regulations in force.

If there is anything that the National Swine Breeders' As-
sociation can do to assist in getting uniform regulations, I want
to pledge to this body the support of that association. We
do not want to interfere with your work or to presume to come
here and tell you what you can do, but we are interested be-
cause it affects us. It affects our members. Some men who
do not ship from one state to another are not affected at all
by this regulation, naturally; others are held up continually. I
find that I seldom get in a group of pure-bred hog men, but
what some man raises a question as to these regulations. He
asks what he will have to do to ship into this, that or the other
state, and it is mighty hard to get information, and I have to
tell them in most every case that the best information I have
been able to get is as follows, and then I proceed to give them
the information which I have secured from the reports which
have come in to me; but I would like to see something done to
get more uniform regulations than we have at the present time, particularly covering these interstate shipments of pure-bred hogs in crates by express.

President Dunphy: I am sure, gentlemen, we are all pleased this morning to have had these questions brought up by Mr. Carmicheal, secretary of the Swine Breeders' Association. These questions that he has raised in regard to interstate shipments have often puzzled us in our own office in regard to the shipment of swine from our state into various states, and I hope there will be something done before this association adjourns this year to try to make these matters a little more simple and a little more convenient for men that are shipping pure-bred swine from one state to another.

The program you will notice is somewhat changed from the printed program in your hands today as laid out. This program was changed by request of the chairman of the committee on this division, and another request was made in regard to discussions, that we hear the papers and then take up the discussions afterward. The next paper on our list is the "Report of Progress in Hog Cholera Control," by U. G. Houck, Washington, D. C., Chief, Division of Hog Cholera Control, U. S. B. A. I.

REPORT OF PROGRESS IN HOG CHOLERA CONTROL

By U. G. Houck, Washington, D. C.

The United States at the beginning of the present year contained approximately 42 per cent of all the hogs in the world. Our swine population at that time numbered 75,587,000, which was more than the combined total number in any other ten countries. This number does not include those farrowed since January 1, 1918, and marketed before January 1, 1919. During the past year the flesh of swine constituted nearly one-half of our meat diet, and more than two-thirds of our total exports of dressed meat were pork products, while of animal fats exported more than five-sixths were lard. Within the last ten years the population of this country has increased about 39 per cent. Our pork production is the only branch of the meat industry that has been able to keep pace with the rapid increase of population. When it is realized that in one year (1918) we produced 11,226,000,000 pounds of pork products, with a surplus of about 2,250,000,000 pounds, it is evident that this great and growing national industry is deserving of our fostering care.

Hog Cholera the Most Destructive Disease of Swine

It is established by evidence on every hand that hog cholera has been, and continues to be the greatest impediment to the
swine industry, since it, with its complications, is probably responsible for about 90 per cent of the mortality of hogs that die on farms and in feed lots. During last year more than two and one-half millions of hogs were allowed to die in the United States from hog cholera. The fact that for the past 11 years we have had a reliable preventive treatment at our disposal and yet have allowed this heavy loss to continue seems to indicate that we are not giving to the swine industry as much protection as it should receive.

Confidence Established in Serum

In 1908 the Department of Agriculture commenced to urge the immunization of swine against hog cholera by what is known as the Dorset-Niles treatment. While state institutions seemed slow to realize the possibilities from the use of this treatment, commercial establishments grasped the opportunity to supply the public demand for serum and virus, and up to July 1, 1913, they were allowed to prepare and handle these products in their own way without state or national supervision.

The impotent and contaminated serum and virus placed upon the market prior to the passage of the virus-serum-toxin act, together with faulty technic in administering the treatment and the inability of many veterinarians to differentiate hog cholera from other swine diseases, produced disappointing results in so many instances that the immunization treatment was not growing in popularity as it deserved and in some sections it was regarded with doubt, and in some instances, disfavor. Up to this time the Department had undertaken no extensive field experiments or demonstrations for the eradication of hog cholera, but during the widespread outbreak of the disease in 1912 the Bureau decided to conduct some demonstrational and investigational hog-cholera work directed by the Biochemic Division in selected areas in co-operation with state regulatory authorities and extension divisions of Agricultural Colleges to ascertain the best adaptable methods for controlling hog cholera and to show live stock owners and others how they might reduce their losses from the disease through the proper use of potent serum and virus properly administered in conjunction with the application of quarantine and sanitation. A sum of $75,000 was made available through appropriation by Congress for conducting such activities during the fiscal year 1913. On July 1 of that year the work was commenced in Dallas County, Iowa, and before the end of the calendar year it had been extended to four counties, each located in a different state. The results
obtained from the use of serum in connection with the other repressive measures employed were so gratifying and the demands for extension of the service were so pressing that on February 23, 1914, Congress appropriated $450,000 to continue the hog-cholera activities. The work was gradually extended to 17 counties in different portions of the country in the latter part of 1914, but the outbreak of foot-and-mouth disease in the fall of that year made it necessary to drop it in two counties and interfere with it materially in others. The satisfactory results obtained by the Bureau and the co-operating agencies established confidence in the preventive treatment and gave an impetus to the production and use of serum throughout the country, and hog production was greatly increased in the areas covered by the demonstrational and educational work.

Funds were provided by Congress to continue the work during the fiscal year 1916 and on January 1 of that year the Office of Hog-Cholera Control was established in accordance with the policy of the Department to segregate research, extension, and regulatory work from each other. Up to this time the activities in the selected counties were carried on with free serum and virus administered by Bureau veterinarians, free of charge. This plan served a useful purpose, but it proved impractical and too expensive for extending the activities to cover a larger territory. Therefore, in 1916 the Department discontinued furnishing free serum, and the operations were restricted to 10 states but extended to cover larger areas in each state. Under this arrangement assistance was given to 127 counties in the 10 hog-growing states selected.

The sum provided by regular appropriation for hog-cholera work was increased in August, 1917, by an allotment of $196,400 from the war emergency funds, which made it possible to further intensify the work and extend it within the remainder of the fiscal year from 127 counties in 10 states to 295 counties in 14 states. A special feature of the project in 1917 was the successful efforts in enlisting the support and co-operation of practicing veterinarians, resulting in more uniform and successful methods of treatment and charges. The allotment from the war emergency fund for hog-cholera control for the fiscal year 1918 was increased to $202,965. By the judicious use of this sum, in addition to the regular appropriation, the Bureau was able to further extend its co-operative activities from 295 counties in 14 states to state-wide efforts in 34 states. The extension of the work as a war measure gave swine breeders better
protection against losses from hog cholera than they had ever before received, and there was an increase of about four millions in our hog production and a marked decrease in losses from swine diseases. The mortality fell from 119.9 per 1,000 in 1914 to 42.1 per 1,000 in 1918, which was the lowest in 35 years.

**Progress of the Work During the Last Fiscal Year**

In April, 1919, the Office of Hog-Cholera Control was made a division of the Bureau. The work under this division has progressed along the same lines as in the preceding year, in co-operation with state regulatory authorities and the extension divisions of state agricultural colleges in 34 states where hog raising forms an important part of farming activities.

There was an increase in hog production of more than four millions over the preceding year, and, notwithstanding this large increase in the number of swine and the abnormal conditions that prevailed as a result of the war, the mortality of swine from all diseases was further reduced from 42.1 per 1,000 in 1918 to 41.4 per 1,000 in 1919, which is equivalent to about 37 per 1,000 from hog cholera. This is the lowest mortality that has been recorded in 36 years.

To cope with the abnormal conditions during the war the field force was increased in the early part of the last fiscal year considerably above the average for the twelve months, which made it necessary later to reduce it accordingly and restrict operations in order to hold the expenditures within the limits of the appropriation. As seven states were able to give financial assistance in maintaining the forces in the field until the present appropriation was available it did not become necessary to discontinue entirely the operations in any state. The assistance furnished by those seven states was appreciated by those engaged in the swine industry as well as by the Bureau.

The work of the field inspectors was materially increased during the year through the necessity of giving attention to the many additional garbage-feeding stations established in the neighborhood of large cities and army camps and the repeated observations of the live stock on farms in various states to which the 614,673 feeder hogs were shipped after immunization at public stockyards.

During the fiscal year ended June 30, 1919, there were 12,336 outbreaks of hog cholera reported to the Bureau inspectors by county agents, live stock owners, and others in the 34 states.
A total of 53,586 postmortems were conducted in connection with the 51,022 investigations made on farms where outbreaks of disease occurred. Appropriate literature was widely distributed and 2,734 meetings were held in hog-raising districts for the purpose of forming organizations and giving information to live stock owners concerning the application of quarantine, sanitation, and the serum-preventive treatment as the most successful means of preventing losses from hog cholera. These meetings were attended by 78,584 farmers and others, and in addition the inspectors had personal interviews with 315,359 live stock owners, bankers, veterinarians, county agents, and others at their homes, places of business, or in the offices at the local headquarters.

During the year 93,512 farm visits were made by the inspectors at the request of the owners or otherwise to observe the conditions of live stock and give advice and other assistance. There was a marked increase in the number of farm visits last year because the inspectors have come to realize more fully than ever before that the nearer they can get to the stock raiser the more good can be accomplished and there is no place so favorable for discussing these matters with a farmer as in the feed lots on his own farm. In the performance of their official duties the Bureau representatives traveled 2,029,519 miles; they treated 233,987 hogs for demonstration purposes, and the reports seem to indicate that at least 12,000,000 in addition were treated in the United States by veterinary practitioners and others.

There were 9,564 farms quarantined under the direction of the co-operating regulatory authorities in the 34 states on account of hog cholera and of these 4,382 were cleaned and disinfected. Considering the number of outbreaks that were reported during the year, it seems that the importance of quarantine and disinfection is not fully appreciated by either the state authorities or live stock owners, and these matters are not receiving the attention they should.

During the calendar year 1918 about 528,306,874 cubic centimeters of serum was used, the mortality of swine was further lowered, and in general much good was accomplished, but at the same time swine owners allowed 2,815,000 hogs to die of cholera, which shows that we are not making as rapid progress as we might in preventing losses or in eradicating the disease. The best results that we may hope for until the work is intensified and extended through more liberal appropriations, through
closer co-ordination of efforts and more effective co-operation
by all concerned, is only a fair control of the disease through
the liberal use of serum and the application of such sanitary
and quarantine measures as we are able to apply under existing
conditions.

Attention seems to be centered on immunization while we
are generally negligent in regard to our efforts to prevent the
spread of the infection from primary outbreaks. It does not
seem to be fully appreciated that quarantine, cleaning, and dis-
infection are of as much importance in combating hog cholera
as they are in eradicating outbreaks of such diseases as foot-
and-mouth disease, glanders, or anthrax.

**Funds for Hog-Cholera Control**

The matter of funds is an important feature of co-operative
hog-cholera work. Up to the present time some of the largest
and richest hog-growing states have not provided funds effec-
tually to co-operate with the Department in combating hog
cholera within their borders. It might be expected that any
state receiving assistance from the national government would
appropriate at least as much money for co-operation as the
national government is willing to use in that state. The hog-
cholera work has advanced beyond the experimental stage, and
in future those states which do not provide adequate funds for
co-operation with the Bureau should not expect to receive the
same consideration in the allotment of Bureau funds as those
which make liberal appropriations for co-operative hog-cholera
work. At the present time the Bureau has 140 veterinarians
detailed to hog-cholera work in 34 states. If the states had an
equal number devoting their entire time to the work, the losses
from hog cholera could be reduced sufficiently to bring very
large returns to the swine industry from the investment. We
are approaching the time when a state receiving assistance in
hog-cholera work will be expected to assign continuously to
the work at least as many veterinarians as the Bureau fur-
nishes. Congress appropriated $446,865 which may be used
for hog-cholera control work during the present fiscal year. A
recent survey showed that the combined available funds of the
34 states for co-operation with the Bureau probably will not
amount to over $250,000, which is about one-eleventh as much
as 44 states have appropriated for tuberculosis-eradication work
and about one-fourteenth as much as was provided for tick
eradication in 1918 by the states and counties in the 10 states
where that work was carried on. From present indications it
seems quite probable that the southern cattle tick will be exterminated and that tuberculosis will be eliminated from our breeding stock, while the great losses from hog cholera will continue to drag along from year to year unless swine owners, through their organizations, make known their wishes and give better support to the live stock sanitary authorities in their efforts to induce state legislatures to make more liberal appropriations to combat hog cholera.

**State Live Stock Laws and Regulations**

There are a number of matters of importance in connection with the hog-cholera work that might be discussed—one of the most important of which is state laws and regulations. Various state authorities and prominent members of live stock associations have commented liberally on the variations in state laws and regulations affecting the movement and supervision of live stock to prevent the introduction and spread of disease, and suggestions have been made in regard to the desirability of uniformity. Under present conditions shippers of breeding animals are frequently subjected to inconveniences and annoyances and have a reasonable excuse for their mistake in shipping interstate. The radical differences that exist in the requirements of different states are bewildering and inexplicable, and give opportunities for just criticism on account of the apparent contradictions expressed in official regulations. The agents of transportation companies can scarcely be expected to keep themselves informed on the varying requirements and frequent changes in the different states, and in general there is confusion and considerable dissatisfaction.

It seems reasonable to suppose that laws and regulations which have been found necessary to protect one state against the introduction and spread of hog cholera would prove equally effective and desirable in any other state.

The differences that exist in state laws and regulations are probably due to the variations of public sentiment that exist in different sections of the country. In some states the live stock sanitary authorities have been unable, when they have tried to secure the passage of laws which they know to be important, to properly protect the live stock industry. In other states they hesitate to attempt to enforce the good laws they have because of the low ebb of public sentiment. It is generally recognized that any policy that is adopted for combating contagious animal diseases must have the support of public sentiment to prove successful. This has been demonstrated in the eradication of
such diseases as foot-and-mouth disease, sheep scabies, and the Texas-fever tick. Where public sentiment is strongly in favor of tick eradication the ticks disappear rapidly, but in those communities where dipping vats have been repeatedly dynamited the extermination of the tick is prolonged and the task is more irksome and expensive.

Live stock men generally are intelligent and if they were made to understand, through their organizations or otherwise, that rigid uniform state laws and regulations are needed better to protect their interests there is no doubt that they would give their support to such measures. There is a need for specifically directed educational work to secure uniformity in state live stock laws and regulations. It might be charged that the requirements of some states are inadequate and that the live stock sanitary authorities of some states have not given this matter the attention that it deserves.

**Variations in State Laws and Regulations Relating to Swine.**

Recent official correspondence with state live stock sanitary authorities in connection with the revision of a Bureau publication entitled "State Sanitary Requirements Governing Admission of Live Stock" reveals the following facts, tabulated to show at a glance the radical differences that exist in state requirements:

**Admission of Hogs Intended for Breeding Purposes.**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>No requirements</td>
<td>7</td>
</tr>
<tr>
<td>Permits required</td>
<td>4</td>
</tr>
<tr>
<td>Permits required if from public stockyards</td>
<td>1</td>
</tr>
<tr>
<td>Accepted on affidavit of shipper</td>
<td>8</td>
</tr>
<tr>
<td>Accepted on affidavit if for exhibit</td>
<td>1</td>
</tr>
<tr>
<td>Accepted on affidavit or health certificate</td>
<td>3</td>
</tr>
<tr>
<td>Accepted on affidavit if from a district free from cholera</td>
<td>1</td>
</tr>
<tr>
<td>Health certificate required</td>
<td>31</td>
</tr>
</tbody>
</table>

(The time required for premises at point of origin to be free from hog cholera varies from 6 weeks to 6 months).

Immunization required if from public stockyards          | 13     |

(The time required to elapse before shipment following immunization with serum alone varies from immediately to 30 days and for serum and virus, 3 hours to 30 days).

Disinfection of animals required if immunized with serum and virus | 9      |

Disinfection of animals required                          | 1      |

Disinfection of cars before loading required              | 11     |

Disinfection of shipping crates required                  | 5      |

Quarantined at destination if from public stockyards      | 3      |

Health certificates required for hogs intended for exhibition purposes | 4      |
Admission of Hogs Intended for Feeding Purposes.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>No requirements</td>
<td>8</td>
</tr>
<tr>
<td>Permits required</td>
<td>7</td>
</tr>
<tr>
<td>Shipments may be made on affidavit of shipper</td>
<td>5</td>
</tr>
<tr>
<td>Health certificate required</td>
<td>30</td>
</tr>
<tr>
<td>Health certificate or immunization required</td>
<td>3</td>
</tr>
<tr>
<td>Immunization required</td>
<td>12</td>
</tr>
<tr>
<td>Immunization required if from public stockyards</td>
<td>3</td>
</tr>
<tr>
<td>(The time required to elapse before shipment following immunization varies from 3 hours to 90 days).</td>
<td></td>
</tr>
<tr>
<td>Disinfection of animals required</td>
<td>10</td>
</tr>
<tr>
<td>Disinfection of animals required if treated with serum and virus</td>
<td>1</td>
</tr>
<tr>
<td>Disinfection of cars before loading required</td>
<td>13</td>
</tr>
<tr>
<td>Quarantined at destination</td>
<td>7</td>
</tr>
<tr>
<td>Quarantined at destination if from public stockyards</td>
<td>1</td>
</tr>
<tr>
<td>(Time held in quarantine varies from 21 to 30 days—one state as long as necessary).</td>
<td></td>
</tr>
<tr>
<td>Not to be unloaded in public stock yards en route</td>
<td>9</td>
</tr>
</tbody>
</table>

These figures speak for themselves and other comment is unnecessary. It is suggested that this association might consistently give some attention to this matter. As the first step in attempting to secure more uniform regulations affecting the movement of swine, it is further suggested that the Committee on Hog Cholera might prepare for the consideration of this body a tentative draft of regulations which would seem generally adaptable for governing interstate and intrastate movements of swine and afford a reasonable guarantee against the introduction or dissemination of hog cholera. It is believed that the federal regulations should be incorporated as a part of state regulations.

In the control of hog cholera the national and progressive state authorities are especially impressed with the importance and desirability of uniform state requirements affecting the following matters.

1. The immunization of swine as a requirement for admission into a state.
2. The enforcement of an effectual quarantine on the farm at destination of all swine from public stockyards or from another state for feeding or breeding purposes.
3. Quarantining premises where hog cholera appears, posting notices and issuing warnings.
5. Effectual destruction of the carcasses of animals that die of disease on farms and in feed lots.
6. Cleaning and disinfection under proper supervision of infected premises.
7. Cleaning and disinfection of cars and crates used in the transportation of live stock for feeding, breeding, or exhibition purposes.

8. Licensing and supervision of garbage-feeding plants.


**Control of the Distribution of Hog-Cholera Virus**

Considerable might be said on each of the subjects above specified if time would permit, but there is one that stands out prominently at this time, since laymen seem to be losing their fear of virus and are inclined in some sections to undertake to use it in the immunization of their own herds and those of others.

The discovery of the effects of hog-cholera virus in conjunction with the use of serum was a wonderful boon to the swine industry. Virus is generally recognized as a vital factor in the control of hog cholera, but it is dangerous. There is no doubt that there have been many outbreaks of hog cholera resulting in great losses through the careless handling and use of this product. The present practice of permitting serum companies to ship virus promiscuously on order without supervision or check is deserving of serious consideration.

The state authorities who are charged by law with the protection of the live stock industry are the proper persons to distribute or control the distribution of virus within their respective states. If only state officials would take control of the distribution of this product they could specify who should and who should not administer the simultaneous treatment, and thus prevent virus from getting into the hands of incompetent, unreliable, and unlicensed individuals.

According to the correspondence previously specified, at present only seven states have regulations controlling the distribution of virus. Expression has been given to the belief of many that the federal regulations should prohibit the interstate shipment of virus to any but authorized state officials; but the states are not prepared for such a regulation and probably there are some that would oppose it. However, an important step will have been taken toward reducing the losses from hog cholera and toward eradicating the disease when all the states can see their way clear to place the distribution of virus within the state under the control and supervision of the live stock sanitary authorities.

**President Dunphy:** The next paper on our program as we have arranged it today would be the report of the Committee on Hog Cholera, by A. L. Hirleman, Georgia, inspector in charge, U. S.
B. A. J.; but this report you will notice, has been printed, and circu-
lated among the members of the association, and anyone who has not
received a copy of this report can get one. This I think was a very
wise move on the part of the committee, but as the report is not
signed, I am going to read the names of the committee on Hog
Cholera Control: A. L. Hirlen, Atlanta, Ga.; R. R. Birch, Ithaca,
N. Y.; R. A. Craig, LaFayette, Ind.; E. A. Cahill, Indianapolis, Ind.;
S. E. Cosford, Lincoln, Neb.

This report will be discussed with the rest of our program on hog
cholera when we get through with the other numbers. The next
number on the program is a report from Dr. Kinsley, or a paper by
Dr. Kinsley, and I believe he has cut out part of his paper and will
discuss for a short time *B. Coli Communis*.

**DR. A. T. KINSLEY:** The chairman made a slight error in his
announcement. Your committee on differential diagnosis of in-
fected swine diseases found that they had an enormous task.
We have made an effort in every way possible to summarize our
present knowledge of some of the diseases of swine. Unfor-
tunately two of our committee have not been present at this
meeting, or at least I have not been able to see them up to
this time, and I am going to read you a summary that has been
confirmed by Dr. King, Dr. Dimock, and myself, and not by Dr.
Boyd and Dr. Jay, the other two members of the committee. It
is possible that Dr. Boyd will have a paper to present to the
secretary that will be published, and the same applies to Dr.
Jay. After I have finished this report, Dr. Dimock will make
a few remarks concerning the B. coli communis, and Dr. King
has some remarks relative to the B. paratyphoid organisms, and
perhaps some additional remarks.

**DIFFERENTIAL DIAGNOSIS OF INFECTIOUS
SWINE DISEASES**

By A. T. Kinsley, W. W. Dimock and Walter E. King.

Your committee feels that the members of this association
are more interested and concerned as to the conclusions that
may be drawn from the basis of present knowledge than in a
detailed discussion of microorganisms.

We have come to a time when the reports from the sources
that the veterinary profession look upon as being reliable and
trustworthy are absolutely contrary; for example, a paper is
read discussing a disease in swine supposed to be caused by a
certain microorganism, and at the same meeting it is asserted
in the discussion that there is no evidence to show that the

*The report was read and approved by W. L. Boyd and Robt. Jay, mem-
bers of the committee.*
microorganism in question is the primary cause of a disease in swine.

We all recognize the limitation of human effort and we also recognize the possibility of error by our most conscientious and careful workers; but the veterinarians engaged in investigation and research should appreciate how difficult it is for sanitary officers and other interests vitally concerned in the diseases of live stock to appreciate such differences of opinion among investigators who are supposed to be conservative and reliable in their work. We fully appreciate and realize that the correct solution of the problems in question would be of untold value to the swine industry. On the other hand we are of the opinion that facts alone should be given preference and prominence and stated in positive terms and that the unproved theories must be stated only as suppositions.

In order that the summary of a report may be understood as having a reasonable degree of foundation we have attempted to briefly outline the diseases of swine as we understand them at the present time. The following list of abnormal conditions in swine is therefore given primarily as a basis for consideration and is not offered as an arbitrary classification. However, in suggesting names by which we shall know the different diseases occurring in pigs we feel that it is the best that can be proposed on the basis of our present knowledge. In every instance, where possible, we thoroughly believe in using a term that indicates the cause; but in those cases where the cause is not definitely known or agreed upon we feel that a term should be used that is based upon the most characteristic feature of the condition, be it either clinical, pathological, etiological, or a layman’s term by which the condition has been known for a long time. The proposed list is as follows: hog cholera, hemorrhagic septicemia, abortion, pig scour or dysentery, tuberculosis, actinomycosis, anthrax, malignant edema, infectious rhinitis, infectious necrotic enteritis.

Hog cholera is the most important infectious disease of swine. In the effective control of hog cholera there is unmistakable need for improvement. Our information as to the cause of hog cholera is incomplete, and until more definite knowledge of the cause of this disease is forthcoming the control of hog cholera will not be efficient. Such improvement will tend to prevent losses at present assigned to other diseases and the many inexplicable complications.

The committee concurs in the belief that hemorrhagic septicemia does occur as a primary disease in swine, although from
the history and clinical investigations of outbreaks, it is evident that in the majority of instances hemorrhagic septicemia is a secondary disease.

From field reports it is evident that an infectious abortion exists in swine. The conditions under which abortion in swine occurs indicate that it is of an infectious nature. A microorganism described as the bacillus of abortion in swine has been isolated, and experimental evidence pertaining to this microorganism further supports the belief that abortion exists as a specific infection.

Scour, or dysentery, of suckling pigs is recognized clinically; various microorganisms of the colon typhoid group have been found in this condition. Scour in pigs may be satisfactorily controlled by observance of proper sanitation and feeding.

Porcine tuberculosis and actinomycosis have been positively demonstrated. Tuberculosis of swine is on the increase. Tubercular cattle are the usual source of tubercular infection in swine. The lesions of porcine tuberculosis is very similar to tubercular lesions in other animals. Actinomycosis of swine is very prevalent in some sections of the country. This disease is prone to attack the mammary gland or scrotum, and the lesion produced is identical to the actinomycotic lesion occurring in other animals.

Anthrax occurs in swine. The usual source of infection is carcasses of animals dead of anthrax or contaminated foods.

Malignant edema has also been identified in swine but is not of serious consequence economically considered.

Infectious rhinitis (bull nose) is a relatively common condition in swine. This disease is characterized in the beginning by a catarrhal inflammation of the nasal mucosa which soon becomes mucopurulent in character. Later there is involvement of the cartilages and osseous structures of the nose and face, resulting in the condition popularly known as "bull nose." The most common causative microorganism associated with infectious rhinitis is the B. pyocyaneus and this microorganism may be the specific causative agent.

The following microorganisms have been identified in the discharges and diseased tissues of swine. B. necrophorus, B. suipestifer, B. pyocyaneus, M. pyogenes suis, B. pyogenes suis, B. paratyphoid, A and B, B. enteritidis and B. coli communis or spirochaeta hyos.

These microorganisms may or may not be pathogenic for experimental animals. They have been isolated from apparently
normal swine as well as from diseased swine. The exact patho-
genic relationship of any of the above mentioned microorgan-
isms is not understood. They may be primary invaders or they
may be secondary to some primary disease or process.

Some of us are of the opinion that so-called infectious necrotic
enteritis of swine is a specific infective disease rather than the
result of a variety of infecting microorganisms. The conditions
under which the disease occurs, its course and nature seem to
warrant our looking upon infectious enteritis as a specific in-
fecious disease of pigs, and until such time as the true causa-
tive agent is known, prevention and control should be carried
out by proper methods of sanitation, together with the use of
such medicinal agents as have apparently materially helped in
the prevention of this disease. When the true cause of the
disease has been determined the possibility of prevention by the
use of biological agents will be indicated.

"Salmonellosis" was proposed some years ago as the term by
which the disease caused by the B. suipstifer should be design-
nated. Since the name was proposed in honor of Dr. Salmon,
who not only directed but took an active part in the early work
concerning this microorganism, we suggest that if the B. suipe-
stifer is proved to be the cause of infectious enteritis that the
disease be designated as "Salmonellosis."

A condition occurring primarily in the south and ordinarily
known as "thumps" has been observed. This disease or condition
is sometimes fatal, and an animal dead of this condition, when
carefully autopsied, reveals no gross lesions. There is a char-
acteristic clinical picture of abdominal breathing, but we have
no positive knowledge of the causative agent.

A form of dermatitis usually called measles and consisting of
a papular eruption in which the papules latterly become denuded
and form ulcers, has also been observed. In swine affected with
this so-called measles, there is an associated purulent inflam-
mation of the ocular mucosa. No definite information relative
to the cause or extent of this condition is available. The mor-
tality is low, however, the economic importance of this disease
being due to the fact that pigs that have recovered from so-
called measles become stunted and do not develop properly.

Recently a condition popularly known as "flu" or influenza,
which may be clinically distinct and characterized by an acute
inflammatory disturbance of the anterior respiratory mucosa and
associated with systemic disturbances, has been discussed, but
the causative factor has not been identified.
Swine are subject to pneumonia. In some sections of the country the most common source of porcine pneumonia is parasitic. Aside from the parasitic types of pneumonia, swine are subject to pneumonia of bacterial origin. These animals, like other animals, probably rarely become affected primarily with infections of sufficient virulence to produce pneumonia, but when the animals are predisposed many infective agents are capable of producing inflammatory changes in the lungs.

One of the most serious problems, in our judgment, that confronts the swine industry of today is the loss incidental to immunization in public markets. A large percentage of the losses that occur in shipped feeder hogs can be reduced to a minimum by proper handling of hogs prior to vaccination, by obtaining a more rapid means of transportation, and by proper feeding and maintaining good sanitary surroundings at destination.

We condemn no effort that has been made to control the various aforementioned conditions and we are unable to advise the proper means of control other than hog cholera and hemorrhagic septicemia, until the definite etiologic relationship of the various pathogenic bacteria isolated from lesions of swine has been determined.

Time has been entirely insufficient for this committee to make a complete and exhaustive report upon this important subject, and we recommend that a committee on Differential Diagnosis of the Infectious Swine Diseases be continued.

President Dunphy: In marking our revised program, I did make a mistake, which I apologize to Dr. Kinsley for. I think it would have been a serious mistake, too, as this association would have missed Dr. Kinsley's very valuable report. I will now call on Dr. Dimock for his part of the report.

Dr. W. W. Dimock: (Kentucky), Mr. President and gentlemen, I am wondering if you really care to listen to a brief statement that I have on the Bacillus coli communis, which was originally assigned to me for my part of this report. I would like to say at this time that I have nothing on the Bacillus suispestifer, because what we had to say in regard to the Bacillus suispestifer as a cause of disease in swine, was included in the report as a whole.

Bacillus Coli Communis

By W. W. Dimock, Lexington, Ky.

The B. coli communis has long been recognized as a constant and I think we may correctly say normal inhabitant of the intestinal tract of our domesticated animals. It is very probable that the B. coli communis has some association with the various physiological functions of the digestive tract, and that this
organism with others plays an important part in the digestion of proteins in the large intestines, which have not been acted upon by the digestive fluids acting in the small intestine. (Smith p. 221).

Recently, in both human and veterinary medicine, this microorganism has been looked upon as being of considerable importance as the cause of various lesions occurring in the body.

The cultural characteristics, results of experimental inoculations, the frequency with which the organism is found in the body tissues of itself and in association with other microorganisms, and the resulting lesions have all been fully and well described in our textbooks and journals. I, therefore, will confine my remarks in regard to the importance of this organism to a summary that would seem to me to be reasonably correct on a basis of what is known in regard to this bacillus and its invasion of tissues. First, I believe that we could conclude that the B. coli communis rarely, if ever, invades the deeper tissues except in case the structures with which this organism comes in contact are altered, thus predisposing them to invasion that under normal conditions is practically impossible. In a very great per cent of the cases in which the B. coli communis has been found in the body tissues, either before or after death, it is possible to demonstrate that some abnormal condition existed that facilitated or made possible its migration into the tissues. The few cases in which this organism has been found in the deeper tissues of the body and in which the portal of entrance was not demonstrated does not in my opinion mean that the organism penetrated the unbroken membranes or healthy structures of the body. It is far more probable that from functional disturbances or as the result of a minor lesion, the natural barriers were lowered to a point sufficient to enable the organism to gain entrance to the blood and deeper body tissues: the functional disturbances may have been so slight as to have gone wholly unobserved clinically or otherwise and the lesion being of such a nature or location as to go unobserved or healing leaving no gross evidence of its existence. The organism having once gained entrance to the body could easily pass through various channels and finally become localized, producing at the point of localization a change in the tissues characteristic of it, that is, inflammation, abscess formation, and possibly septicemia, although the septicemia so often attributed to the B. coli communis probably never takes place, except in those cases where the body resistance is materially lowered from other causes.
In some instances the B. coli communis may produce lesions more or less acute but the great majority are chronic in nature, and the infection is finally overcome. Therefore from the standpoint of sanitation the B. coli communis can for all practical purposes be ignored because the animal body being in a state of health, and the disease conditions common to swine reasonably well controlled, the B. coli communis will naturally remain in its normal habitation, and the isolated instances where it may gain entrance to the body will be of exceedingly minor importance.

President Dunphy: I now take pleasure, gentlemen, in calling on Dr. Walter E. King for his part of the report.

Dr. W. E. King: (Minnesota), Gentlemen, on account of the lack of time I wish to omit some material which is of minor importance, which I have prepared, relating to the paratyphosus, A. and B. I have just one point or two which I would like to express, and with your permission I shall give that part of the paper.

The name, paratyphosus, was first proposed in 1898 and used (Bacillus paratyphosus B) to designate a typhoid-like bacillus, isolated from a case of osteomyelitis. The following year the name, paracolon, was given to a similar organism isolated from thyroid abscesses. In 1900 a typhoid-like bacillus was isolated by Schottmüller from blood of cases showing clinical symptoms of typhoid fever. Following this work a series of investigations showed conclusively that there were two organisms resembling the typhoid bacillus which were designated B. paratyphosus A and B. Both organisms possess biological characteristics of the colon-typhoid group, and both are capable of producing symptoms and pathologic changes similar to those found in enteric fever.

In 1888 Gaertner isolated an organism which he designated, Bacillus enteriditis from an epidemic of food poisoning.

In attempting to identify the above organisms, it is found that B. paratyphosus A more nearly resembles B. typhosus, and that B. paratyphosus B and B. enteriditis are more closely related to B. cholera suis or B. suiptestifer. Clinical manifestations following the inoculation of these organisms into experimental animals show that all are capable of producing a condition of septicemia. The organisms may be differentiated by means of their cultural characteristics, reactions in different sugars, and agglutination and complement-fixation tests. In differentiating between them through culture reaction, the use of milk cultures and carbohydrates is of greatest importance. The action of paratyphosus A upon litmus milk shows the production of
slight acidity, which later changes to neutral. Paratyphosus B first turns the reaction of milk acid and later alkaline. The cultural reaction of B. suiperstifer and B. enteriditis are practically the same as that of B. paratyphosus B. Jordan has shown that they may be differentiated by means of various carbohydrate culture media and by use of lead acetate agar.

While the biochemic characteristics of both organisms show their close resemblance, agglutination tests also indicate their relationship. The results of agglutination tests may be illustrated by the work of Bainbridge which shows that in any illustrative test in which B. paratyphosus A agglutinated homologous serum in dilution from one to fifty thousand, B. paratyphosus B and B. suiperstifer and B. enteriditis also agglutinated the same serum in dilutions of one to one hundred. While it is quite practicable to use agglutination tests in differentiating these organisms, it is clearly indicated by cross agglutination that a great similarity exists among the organisms of this group.

Much of the work which has been done on B. paratyphosus A and B has been related to study of these organisms in connection with the clinical manifestations and pathogenic changes found in paratyphoid fever in man. B. enteriditis has been isolated from cases of food poisoning in man and from various epizootic diseases among animals, particularly rats, rabbits and guinea pigs. It has been found in cases of navel ill in sucklings.

The work of Winslow, Kligler and Rathberg (Jour. Bact., 1919, Sept., p. 429) constitutes one of the latest valuable references to that which has been done in differentiating the members of this important group of organisms. It is interesting to note that the above authors used in their study of B. paratyphosus B 24 typical strains. These strains were received from various laboratories and were designated as follows:

Five as B. paratyphosus, five as B. enteriditis, six as mouse and rat viruses (B. dansyz, B. muriun, B. murisepticus) three as B. abortus, and five under other names (B. typhosis, B. pullorum, B. icteroides and B. paracoli).

This well illustrates the present state of knowledge concerning the differentiation of this group.

So far as our present knowledge goes it may be stated, first, that representatives of the colon-typhoid group may be found at almost any time in the intestinal flora of normal and diseased swine; second, that the members of this group of bacteria are
capable of assuming increased pathogenicity, the virulence of the above named organisms, under certain conditions, rising to a very marked degree. The inference therefore follows that these organisms are seriously important factors, probably not in the form of primary cause of certain infectious processes in swine, but as dangerous secondary infections.

The various lesions present in enteric fever of swine are well known. Practically all of the pathologic changes formerly attributed to hog cholera occur. The questions which confront those interested in the study of swine diseases are: "What organisms are responsible for the symptoms and lesions present in infectious enteritis, enteric fever or so called 'mixed infection' of swine?" "What is the relationship of the various organisms under discussion to each other, and which bacteria of this group are of importance as etiological factors, either as primary or secondary invaders, in connection with swine diseases?" In considering this matter we believe that sufficient experimental observations have been made to inquire into the role which the spirochæte may play as a pathogenic organism.

In order to prosecute this problem, it would afford some assistance if more knowledge existed concerning the etiology and pathology of hog cholera. How can the disease producing activities of B. suipestifer, B. paratyphosus A and B, B. enteriditis, Spirochaetahyos, and other organisms be determined unless more substantial data becomes available, giving definite information as to when hog cholera begins, when it ends, what symptoms it produces, and what lesions are the direct result of infection with specific hog cholera virus. Too much carelessness has been exercised in thinking and writing concerning the ultra-visible virus of hog cholera, as though the specific etiological factor were already determined.

Since the development of anti-hog-cholera serum, which has afforded efficient means for checking the disease, there has been too great a tendency on the part of research workers to consider the problem of hog cholera settled, for all practical purposes. It is now beginning known that all infectious processes in swine cannot be classified as hog cholera, that there are infectious processes other than that caused by the ultra-visible virus, and largely from evidence which is circumstantial and data which is scattered, the impression is becoming stronger that the organisms under discussion are important factors in the production of certain diseases in swine. No more important problems confront the live stock interests of the country today.
A large proportion of the stock population of the United States consists of swine. No problem in the study of infectious diseases, either of man or animal, affords more fascination or greater incentive than the serious study of the swine diseases under consideration.

In recapitulation it may be stated that much stress should be placed on careful studies of the organisms of the colon-typhoid group, the Pasteurella group and the spirochaetes of swine. This should be conducted in conjunction with more research on the hog cholera project. The key to the whole situation is the correct solution of the problem relating to hog cholera, its etiology and pathology.

President Dunphy: Gentlemen, the committee has decided that it is desirable that we have Dr. Hirleman read the report of the Committee on Hog Cholera so that it can be discussed with the other papers in this section.

REPORT OF COMMITTEE ON HOG CHOLERA CONTROL

By A. L. Hirleman, R. R. Birch, R. A. Craig, E. A. Cahill and S. E. Cosford

Except in a few limited areas, it appears that hog cholera is less prevalent than it has been for a number of years; this decrease in hog cholera may be due to the vigorous campaign instituted by state and federal authority, supplemented by the extensive use of either the serum alone or the serum simultaneous treatment; or, it is possible that, as pointed out by Dr. Dorset, the disease increases and decreases in more or less regular recurrent cycles. Accepting this later hypothesis, hog cholera is due to be on the ebb tide during the year 1920.

The past ten years have permanently established the intrinsic value of anti hog cholera serum in the control of cholera. Material progress has been made in the manufacture, distribution and administration of hog cholera serum without, apparently, diminishing the percentage of exasperating disappointments generally classified as "breaks" in hog cholera control. A small per cent of these disappointments may be due to preventable factors such as serum of low potency, under dosing, inefficient administration and, where breaks follow weeks after the serum simultaneous administration of serum and virus, a low virulence of the virus. But, when these preventable factors are duly accounted for, we still have many bad results that tax our ingenuity and defy our skill.
Encouraged by these disappointments, biologic supply houses have experimented with and stimulated the sale of bacterins as specific treatment for so-called specific infections. As yet these remedies have not been used extensively enough, under proper observation, to either endorse or condemn them. Not a few careful, painstaking practitioners endorse both the hemorrhagic septicemia and mixed infection bacterins, while others, equally well qualified, consider them without merit. It appears quite probable to your committee that these preparations have some merit, but evidently our present knowledge of differential diagnosis in hog cholera and kindred infections, if this is possible, is inadequate to enable veterinarians to effectively use this supplemental or specific treatment, as the case may be, in the control of infectious swine diseases.

There is unquestionably at present a greater diversity of opinion among veterinarians regarding the causes of some of the field conditions found in connection with hog cholera work than at any time since the establishment of systematic co-operative hog cholera controlled by and through state and federal agencies.

This confusion of professional opinion does not inspire public confidence. The urgent need of the hour in hog cholera control is, if possible, a clear and concise tabulation of conditions on which to make a reasonably accurate differential diagnosis between cholera, hemorrhagic septicemia, mixed infection and other possible conditions which simulate these diseases. Manifestly this is a task for qualified investigators who have unlimited opportunity in field and laboratory investigations. No other task in connection with hog cholera control has ever been of greater importance, the process of manufacturing hog cholera serum alone excepted.

Your committee believes the time is at hand when through extensive co-operative experiments and investigation the various states and the United States Bureau of Animal Industry should definitely settle these mooted questions. Economic necessity and the welfare of the swine industry demands the establishment of reasonably accurate differential diagnosis, providing, of course, that we have two or more specific diseases to deal with, or, if the diseases that have lately gained considerable prominence, and the specifics offered for their amelioration and control are, or are not, actual factors in the control of infectious swine diseases, such fact should be unequivocally established.

In the course of correspondence incident to preparing this report, one member of the committee writes as follows:
“We can hardly discuss hog cholera without mentioning the mixed infectious diseases. Hog cholera breaks following simultaneous vaccination are sometimes mistaken for ‘mixed infection’ and treated with bacterins; sometimes outbreaks of hog cholera are diagnosed hemorrhagic septicemia and treated with bacterins. These mistakes result in serious losses, and this is one of the conditions that should be considered in connection with hog cholera control. At the beginning of the hog cholera control work a few years ago (1910-1913) very few veterinarians were qualified to take up the vaccination work and recommend practical measures of control. Veterinarians at that time had not studied the pathology of hog cholera and other infectious diseases, as they did not consider them of sufficient importance, This condition has not been satisfactorily overcome; probably fifty per cent of the veterinarians do not take advantage of opportunities given them to secure information relative to differential diagnosis, vaccination and sanitation as they relate to hog diseases. This type of practitioner depends very largely on the information secured through reading publications sent out by commercial biological laboratories, and through discussing his problems with the representatives of these laboratories who may visit him for the purpose of selling him bacterins and other biological products.”

Your committee believes that veterinarians, in addition to the literature above described, should study more extensively the newer text books and available scientific publications. Your committee further believes that, in many instances, veterinarians are entirely too superficial in the investigation on which they base their diagnosis.

Though admittedly many remote factors are occasionally to be considered in the control and suppression of hog cholera, it is certain that the greatest single factor responsible for the disease is the exposed, infected, or sick hog.

Your committee is firmly of the opinion that many cases of hemorrhagic septicemia, mixed infections, etc., are in reality cases of low grade hog cholera which would not occur had the affected animals received larger amounts of virus at the time of immunization.

Under open range conditions hog cholera ranges in cycles of varying frequency. After the very susceptible animals in a given community have died, the disease apparently assumes a milder form which the more resistant animals seem to combat successfully. Succeeding pig crops offering less resistance
to the disease usually fall prey to a more virulent type of infection, introduced by sick hogs, which have strayed or been shipped into the community and again start a new center of virulent infection. This active wave of virulent infection is again followed by a more or less complete suppression of the disease and, in turn, conditions previously referred to lead to another virulent outbreak of cholera.

In stock law districts, where each owner keeps his animals under fence instead of permitting them to run at large, many outbreaks of genuine hog cholera may be traced to the introduction of some new animal into the herd. This animal need not necessarily manifest clinical symptoms of cholera.

Undoubtedly stringent restrictive measures on all movements of hogs, supplemented by reasonable sanitary precautions, would materially aid in the suppression of infectious swine diseases, but, your committee recognized the practical limitation of such a policy.

Your committee believes the time is ripe for calling a special conference of State and Federal officials engaged in hog cholera control work for the purpose of discussing at length and in detail policies and methods now practiced in hog cholera control and to formulate, as far as practical, uniform regulations governing the inter and intrastate movement of hogs for every purpose, and, last, but by no means least, reasonable restriction in the distribution of hog cholera virus.

Your committee is of the opinion that proper control in the distribution of hog cholera virus is one of the most essential factors of hog cholera control. In the effective administration of any law, responsibility and authority must go hand in hand. No officer responsible for the enforcement of any law or regulation can give a good account of his stewardship unless he is vested with the necessary authority; on the other hand no officer clothed with authority sufficient to enforce a law should seek to evade responsibility in any matter pertaining to the enforcement of such laws.

Generally speaking, police regulatory laws are popular principally with those who are not affected by the enforcement of such laws. Of those whose business it restricts or who are otherwise temporarily inconvenienced by the enforcement of a law, a majority are more or less hostile to such laws, to paraphrase this statement:

“The law is unpopular,” and unpopular laws, even though they are basically sound and to the best interest of the masses, are difficult to enforce.
President Dunphy: Dr. Boyd not being present, we will omit his paper and it may be sent in and published in our report. Dr. Robert Jay of Tennessee is not present, but Dr. M. Jacob has kindly volunteered to present his paper.

Dr. M. Jacob (Tennessee): I am very sorry indeed that Dr. Jay is not here to present his paper, and possibly at the same time to defend it. The paper reached me just a few moments ago, and I have had but a short time to read it over. However, as I see it, the one point I think that Dr. Jay is trying to convey and impress is that of the influence of high protein feeding, and especially in recently immunized hogs, and I think it offers some food for serious consideration.

Comparing Swine Plague to Hog Cholera

By Robert Jay, Nashville, Tenn.

While swine plague has been recognized as a separate disease since 1886, its epizootic appearance last year with its apex in the fall has brought its relative importance to hog cholera to our serious consideration. This swine plague propaganda has been fraught with much confusion to the veterinarian but I am quite sure that our experiences during the past year have demonstrated the possibility of its diagnosis. Our attention just now is directed to its correlating or subsequent appearance to hog cholera to account for the small per cent of failures to immunize against that disease. Are we justified in regarding a disease as a mixed infection when we assume that these subsequent invading organisms would be innocuous, had not the filtrable virus first rendered the tissues pervious? Again, the treatment of the herd is not altered either from the standpoint of the sanitary official or of the practicing veterinarian, by this knowledge. It is the filtrable virus which must receive our attention.

Since the advent of anti-hog cholera serum, infectious diseases of hogs have been treated through its use; and, taking our knowledge of infectious swine diseases and the promiscuous use of the double treatment into consideration, with remarkable success. When disease appeared in a treated herd we have generally eliminated hog cholera from possibilities in our diagnosis, but we now know that the treatment of a herd is not positive evidence of immunity and that we are not justified in excluding hog cholera on such assumption.

In considering swine plague as a disease, per se, our first endeavor should be to eliminate the virus of hog cholera. After this is accomplished much of the confusion that exists regarding
mixed infection will go with it. Hog cholera was excluded in our diagnosis in doubtful outbreaks by injecting blood taken from sick hogs in the acute stage of the disease. The blood did not transmit any disease apparently, while the pigs proved susceptible to hog cholera virus later on.

In offering a comparison between the diagnostic features of swine plague and hog cholera as presented in the field; our experimental data to confirm our diagnosis of swine plague is very meager, while the findings in the laboratory were verified by isolation of the bipolar organism from the material submitted, a definite diagnosis of swine plague was withheld for the reason that the organism is so frequently found associated with hog cholera that its presence does not eliminate the filtrable virus and also that it may be quite accidental. From the fact that we had a disease showing a definite incubative period with a febrile stage which was characteristic together with consistent physical indications of pulmonary infection and post-mortem lesions which are common to all septicemias, we concluded we were dealing with swine plague.

The transmissibility of hemorrhagic septicemia to other animals on the farm has been observed; as for instance, on one farm the hogs were first infected, next the chickens, and third, the cattle. The disease was diagnosed in all three species.

The following points of difference have come to our notice in the field. History: No knowledge of exposure to hog cholera with no cases in the neighborhood and no traffic in cholera hogs. This history is usually outstanding in herds with swine plague, and should give us our first hint of exclusion of cholera. In cholera outbreaks we can usually get a history of the existence

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**Comparative Temperature of Hog Cholera and Swine Plague.**

**Febrile Stage of Disease.**

- **Dotted Lines**—Swine Plague.
- **Solid Line**—Hog Cholera.
of the disease in the neighborhood or other possible sources of infection. In this connection will state that we are not aware of an instance where swine plague was transmitted to hogs on adjoining farms showing the lack of value of quarantine restrictions.

To conclude from its sporadic occurrence it would seem that infection introduced from outside sources is not necessary, but that the disease may be autogenous by the changing of the bipolar organism from the benign to a pathogenic type. As authorities inform us that the bipolar organism is found in the soil, food and water, and also in the air passages and intestinal tract in normal hogs, it is quite evident that the predisposing causes play a most important part in determining the attack.

Our observations show that swine plague occurs in hogs that have recently been changed from pastures or range and narrow rations to full feed, especially a diet rich in protein, as in hogs having access to a field of corn and soy beans or cow peas; or turned into a field of alfalfa or rape; or clover with full feed or corn, or turned into a dry lot with access to self-feeders with corn, shorts and tankage; or after a carcass of beef or horse has been dragged into the hog lot. Swine plague frequently shows up in hogs at fairs, when the hogs have been fed for show condition and their movements limited by placing them in small pens, especially when this flushing is followed by chilly nights of autumn and the cold days and nights of winter. We have never observed this disease in hogs on range except during a heavy mist in the fall, when a hog can get his fill without much exercise.

A theory is offered to account for the pathogenesis of the disease: A hypernitrogenous condition due to excessive feeding for fattening or for show condition, restricting movements by taking off range and confining in small enclosure when nitrogenous feeds are not used for muscular repair. This flushing, together with the chilled cutaneous surface which drives the blood to the lungs and digestive tract where these bipolar organisms are found in normal hogs; this nitrogenous media offering a favorable pabulum for the growth of these organisms, changing them from the benign to the pathogenic type which invade tissues and reach the blood stream. May not the causal organism of swine plague possess the properties ascribed to Bacillus suipestifer by Prettner and Emmerich—that of producing nitrous acid in material containing nitrates which may form a nitrite poisoning of the body and the formation of
methemoglobin in the blood thereby preventing proper oxidation of the tissues. This would account for the cyanosis which is so marked in acute attacks of swine plague and which is not in proportion to the impervious lung tissue.

With hog cholera all the requirements of infection are susceptible hogs on any feed or surroundings and the virus of hog cholera which must originate outside of the body.

Onset: Swine plague is characterized by sudden onset—hogs well one day without a history of a single loss, all on feed, the disease showing the following day with distressing symptoms and rapid spread in the herd. In hog cholera we usually have a report of one hog being off, followed by others after the usual period of incubation. The general appearance of a herd in swine plague is characteristic—the sick hogs are full, hair is glossy, showing a high state of thrift just previous to the attack. In contrast with cholera hogs showing gaunt, with hair rough and a general unthrifty appearance.

The temperature readings of swine plague in typical outbreaks have been diagnostic; the high temperatures showing on the first day of the attack, ranging from 104 to 108°, usually dropping to between 103 and 104° the third day when, if the hog survives, it is usually back on feed. In a few pigs showing involvement of synovial membrane by swelling of joints, the rise in temperature has been intermittent. The temperatures in hog cholera, on the other hand, are maintained for days or weeks.

Symptoms: The disease is usually announced by spasmodic breathing-thumps. In the pulmonic form of swine plague, which is observed to be by far the most prevalent form, the hog will sit up on its haunches or lie on its breast; when urged to move will have a violent fit of coughing, some will vomit a thick stringy mucous the first day, markedly tinged with bile. Conjunctiva is red, swollen and weeping; discharge of mucous from nose often streaked with blood. In contrast, the cholera hog lies around with nose poked in bedding or stands apart with tail and ears drooping, the picture of despair. Thumps is rarely seen as an initial symptom and when seen appears at a later stage of the disease; cough when present, is usually weak. The appetite in an acute attack of swine plague is wanting during the febrile stage, but usually returns with the drop in temperature in two or three days. In cholera, the appetite is mincing for a day or two before the loss is complete. In swine plague, hogs may show a diarrhea which does not persist; while in cholera, diarrhea or constipation, or alternating, usually per-
sists throughout the course of disease. While chilling is marked in both diseases, in swine plague, it is more often observed; the bristles are sometimes seen to stand erect, and we have observed in several hogs this peculiarity to persist after a year had elapsed.

The age of susceptibility should also be taken into consideration. Thrifty growing shoats and young hogs are most susceptible; thin, poorly fed and unthrifty hogs seem to be singularly free from the disease, while hog cholera attacks all ages and conditions, pigs seeming to be most susceptible. In swine plague the gait is stilly; in hog cholera, there is a staggering gait which denotes such prostration and is so characteristic.

The morbid changes of swine plague are those common to all septicemias: diffuse redness of the thin parts of the skin, irregular hemorrhagic splotches on the larynx, heart, and especially on the endocardium, the kidneys, however, showing most constantly hyperemia, intense in places, often spoken of as a blush. This blush seems to be fairly constant. On the mucosa of the bladder is sometimes seen raised ecchymotic spots but more often congested. The lymph-glands more often show an alveolar hemorrhagic condition rather than entire involvement of gland and a serofibrinous exudate in the perineal connective tissues and also in the interlobular lymph-spaces in the lungs, often separating the lobules distinctly. The lungs showing red hepatized areas generally lobular in extent. The tendency to gelatinous exudate on serous surfaces seems to be a distinguishing feature. The cases that linger for some days may show an adhesive fibrinous deposit on the pleurae. The pleural sack often containing a bloody exudate, the substance of the lungs showing numerous suppurating foci. In hog cholera, during the acute stage, the generally enlarged and extensively hemorrhagic lymph-glands are marked, especially the submaxillary, which fades, as the disease progresses.

The well-marked circumscribed petechiae on the kidneys, intestinal mucosa, peritoneum, bladder and lungs, together with the characteristic button ulcers which appear later on, to us, mark the postmortem differentiating characteristics.

One attack of swine plague does not immunize against future attacks, as we have observed two herds in which certain hogs were infected twice. In hog cholera one attack protects against future attacks. To sum up, when we investigate a sick herd and have no history of an exposure to hog cholera in a herd which has been flushed with a high protein diet, suddenly show-
ing thumps; lying on breast and when disturbed having violent fits of coughing and vomiting but are strong in their gait, hair glossy, with temperatures ranging from 104 to 108° on the first day of attack and the hogs which have been sick for two or three days with temperatures ranging between 103 and 104°; these hogs coming back on feed; and we have no evidence of the extreme prostration which is characteristic of cholera, we make a diagnosis of swine plague. Blood injections from these hogs have shown us that we were not dealing with hog cholera. On the other hand with the history of cholera in the neighborhood and the advice that the disease is spreading gradually through a herd and when apparently well, though infected hogs show high temperatures and persistent high temperatures in the sick hogs with the extreme prostration, gaunt, arched back, diarrhea or constipation with the postmortem changes that we have regarded as characteristic of cholera; we have no hesitancy in making a diagnosis of cholera.

The mortality in swine plague in herds that we have observed has been very low from naught to 5 or 6 per cent; the losses usually sustained the first twenty-four hours, while in hog cholera in untreated herds the mortality is usually very high. In the bred gilt, the tendency of swine plague to kill the fetus and later on to abort has been observed, and no doubt accounts for the excessive number of abortions this past spring.

In acute attacks of swine plague, immediate relief was given by taking blood from the tail, 5 c. c. per pound weight.

We have concluded that it is a mistake to inject virus when treating a herd with swine plague. Can we expect a tissue reaction to hog-cholera virus with the formation of anti-bodies when the hog is already suffering from another form of septicemia? We have seen several herds so treated which were infected with hog cholera after the usual period of incubation.

Hog raisers should be educated to treat during the summer months when the pigs can get plenty of exercise and are not subjected to the predisposing causes which seem to provoke an attack of swine plague.

President Dunphy: The committee has deemed it advisable to substitute for the paper on “Hemorrhagic Septicemia of Swine,” a paper by Mr. Edward W. Bodington, counsel for the Serum Producers Association, a paper on “State Laws affecting the serum industry.”

Mr. Edward W. Bodington: We have heard discussed here this morning problems which affect the serum industry to a large extent, and problems with which you have been dealing in the past. We want you to feel that the associated serum companies of America is organized along the
U. S. LIVE STOCK ASSOCIATION

lines that you gentlemen are organized on, to protect the live stock industry, and especially the swine industry with which they are particularly dealing.

STATE LAWS AFFECTING THE SERUM INDUSTRY

By Edward M. Boddington, Kansas City, Mo.

The Associated Serum Companies of America desire to express their sincere interest and approval of your efforts and influence during the past twenty-three years. It is quite a privilege and an honor to extend to us the courtesy of presenting a paper before your association in the interest of the swine industry of America. You are organized nationally to promote good fellowship among those engaged in the live stock interests; to devise ways and means to prevent and control diseases of domestic animals, to advocate uniform legislation on sanitary questions, to solve problems on interstate and intrastate movements of live stock. Your influence has been daily felt in every part of the United States. It is natural and proper that all industries and organizations have a common forum for the exchange and interchange of ideas. The anti-hog cholera serum producers are organized in accord with the aims of your association, but we deal mainly with the problems of the swine industry. The serum producers must operate under various state laws, state regulations, federal laws and federal regulations. Today millions of dollars are invested in producing serum. It is a big, legitimate business, here to stay, and an absolute necessity in the production of pork for the market. Our problems are your problems and we may be properly classed as an arm, an integral part of your association.

The outbreaks of hog cholera might well be compared with the temperature curve of a hog that has that disease. We find cholera appeared in 1912, grew worse in 1913, and probably was at its worst in 1914. It was less prevalent in 1915, and in 1916 the conditions were considerably improved, and no little credit for the control of the disease is due the serum industry. In these years the state legislatures in the hog-raising sections at the recommendation of officers in charge of the live stock interests have passed numerous and varied laws on this subject. It was a new problem and a cure was sought in legislation. In the beginning, there were a few who were not as scrupulous as they should have been and perhaps common hog blood and serum of low potency found its way through the
channels of trade to the consumer, which tended to reflect dis-
credit upon the great industry. However, there were as many
and various solutions of the cholera problem by legislatures as
there were hog-raising states.

In 1913 Congress passed what is commonly called the Virus
Serum Toxin Act, and delegated the Secretary of Agriculture
with the power to regulate the serum industry in so far as
interstate shipments were concerned. Under the U. S. Veteri-
nary license, the Chief of the Bureau of Animal Industry and
his assistants have succeeded in curbing and preventing unde-
sirable productions and have perfected a standard, through fed-
eral regulation which has resulted in saving millions of hogs.
The State Legislature of Iowa in 1919 stamped its approval
on this work and paid the Bureau of Animal Industry a high
legislative tribute in the following language: "No anti-hog
cholera serum or other biological products shall be sold or
offered for sale or use or be used in this state which has not
been produced at a plant holding a valid U. S. government
license * * * at the time such products were made."

No higher tribute could be paid to the Bureau of Animal In-
dustry for their untiring efforts in this field and we trust that
other states may follow the lead of Iowa and write into their
statutes their approval of what federal regulation has accom-
plished. Such legislation establishes confidence in U. S. re-
leased products.

We do not care to tire you with the past history of state
legislation affecting the serum industry but bear in mind, state
laws which affect any U. S. licensed serum plant affect you,
the veterinarian, the farmer, the packer, and the marketable
supply of pork. Existing state laws may for convenience at
this time be divided into four groups:

1. Laws to encourage the use of serum and virus.
2. Laws to protect the local industry within a state or spe-
cial interest legislation.
3. Laws purely for revenue.
4. Laws for protection of the swine industry by state licenses
or permits.

In the class of legislation to encourage the use of serum and
virus to prevent hog cholera, we find that many states have ap-
propriated thousands of dollars for research, state plants, dis-
tribution of serum and the dissemination of information to the
hog-raiser. Wisconsin, Kentucky, Iowa, Kansas, Missouri, Illi-
nois, Ohio, Florida, and other hog-raising states have contributed in this regard. The co-operation of the Bureau of Animal Industry, the veterinarians, the swine grower, together with those states that had the interest of the hog industry at heart, and the U. S. licensed producers, have succeeded in reducing the cholera problem to a scientific basis. So far as the state plants are concerned, in most cases they have been failures. The state, a political unit, is out of its sphere in conducting any commercial enterprise of production or manufacture. In one state this year, a producer purchased serum from a state plant at such a low figure that he could resell it at a price that was considerably below the bare cost of producing U. S. licensed serum at his plant. The state serum, not produced under a U. S. Veterinary license, has entered into direct competition with the serum of the U. S. licensed producers at such low prices that the commercial producer in many instances could not afford to do business in many communities. Nearly all state plants have been conducted at a loss to the state and the low price of state-made serum merely reflects in an appropriation by the state legislature which causes an increased tax rate. Such plants may have been justifiable during the experimental stage, but a state is now legally and economically out of its sphere and place when it engages in direct competition with its citizens or the citizens of other states, when the conditions of a general epizootic do not prevail. It is well established that the state as such is not warranted under our laws in operating in a purely competitive and commercial project unless there is a situation beyond the power and control of those already engaged in that enterprise. The state's purpose is to promote the general welfare of its citizens and the state can best perform this duty by encouraging investigation, research and education in the use of U. S. licensed serum.

Under the Florida law of 1919 to encourage the use of serum and virus, Florida will furnish any applicant with serum at 50 per cent of the actual cost of the first 1,500 c. c. of serum and virus, but for any additional amount the applicant must pay the actual cost. An appropriation of $100,000 was made to defray the expenses of this law. This is one method of encouraging the use of serum and virus in a state which may have been backward heretofore in the use of said product.

However, Section 2 of said law provides: "That only those veterinarians, county agents, and laymen who have been granted permits allowing the use of hog cholera serum and virus shall be allowed to inoculate with hog cholera serum and virus, pro-
vided one-half of said serum and virus is furnished by said State Live Stock Sanitary Board."

If enforced literally it would be an infringement upon the rights of the citizens of that state and citizens of other states and is undoubtedly class legislation and unenforcible. It merely illustrates an attempt of an over-zealous legislature to please its constituents. However, we do not anticipate that a strict endorsement of this section will be advocated by any of the state officials.

Some legislatures felt that under the police power they should protect the special interests and plants within the state. In 1917 Tennessee enacted a law forbidding the shipment of virus and serum into the state which was produced within 800 feet of a public stockyard, garbage disposal or rendering plant, and the same year Indiana legislated against admitting any serum into the state produced within 4,000 feet of a public stock yard. Many serum plants doing an interstate business, selling the product in Indiana at that time, were situated within the radius prescribed by said statute. Why should one state designate 800 feet and other 4,000 feet? There is no scientific foundation for either of these arbitrary distance laws and in the case of the Missouri Valley Serum Company vs. L. E. Northrup et al., No. 27998, Marion Circuit of Indiana, the state veterinarian of Indiana, his agents, assistants, and the prosecuting attorneys of the several judicial circuits were permanently restrained from prosecuting those who sold serum produced at a plant within 4,000 feet of a public stockyards. The court of Indiana held such distance laws were arbitrary, unreasonable, and unenforcible.

In many instances broad and unlimited powers were given to state live stock sanitary commissions, commissioners, and state veterinarians, to make regulations as they saw fit on the shipment of virus and serum into the state.

This amounts to a delegation of purely legislative authority to a few and in some cases to one man. Under all state constitutions the power to enact laws rests with the Legislature, but under the police power to protect the Commonwealth, legislatures have stretched the legislative function and placed it in the hands of sanitary boards, commissions or commissioners. This is popularized as legislation by commissions. In a few instances the continued legislative practice by commissions or commissioners has been injudiciously used and various unreasonable requirements have been made.
We are creditably informed that the business in Massachusetts did not justify many serum companies in making expenditures of funds to maintain a testing plant, and as a result only one serum company did business in that state. Among the requisites for serum companies in Massachusetts, the producer had to first obtain a permit from the Commissioner of Animal Industry for each individual shipment of either serum or virus; second, such shipments had to be shipped in care of said department to such place as the commissioner should designate; third, the producer must build, equip and maintain a building suitable for the purposes of testing these products, pay for the testing by a veterinarian registered in Massachusetts; fourth, the producer’s plant must not be within one-half mile of a public stockyards; and fifth, observe all present and future orders which the commissioner may consider necessary.

In the past some veterinarians have secured the lucrative right to distribute virus, and in a few states it did result in an absolute monopoly of the serum business to the company which contracted with the state veterinarian as only that virus distributed by the state veterinarians was permitted within the state. Such a condition no longer exists. The state veterinarians in most instances have been fair, but there are some instances where legitimate U. S. licensed establishments have been unlawfully prohibited from transacting legitimate business. In many states only those holding a permit to distribute serum and virus can do so and there have been instances, and not remote ones, when it was rather difficult for many U. S. licensed serum companies to obtain these permits. In Indiana, serum and virus samples must be deposited and passed upon by Purdue University. It seems that after the federal government has tested all U. S. released serum and virus through the best, most scientific, and up-to-date test known for purity and potency on susceptible pigs, that any additional test which the state may require must be superfluous. It is natural to foster and protect local citizens and industries, but when that protection jeopardizes the hog-raising community during outbreaks of cholera, it seems that states should practice reciprocity and do the greatest good to the greatest number.

We may classify the laws of those states requiring license fees and boards as purely revenue laws. Kentucky requires a license of $50.00, Kansas $10.00, Iowa $15.00 for each person, firm, or corporation selling serum in the state. The bond laws of Nebraska and Kentucky are no protection to the hog raiser, the $5,000.00 bond required in said states merely making an
additional expense which must ultimately be added to the price of serum. These bonds protect no one. The bonding companies recognize this fact when they require only the minimum premium of $5.00 per $1,000.00 for each company doing business in said state. In case of a bond forfeiture the bond money is payable to the state, and what recourse would the hog-raiser have? With the $50.00 license fee and the $25.00 for a bond in Kentucky it makes an item of $75.00 per year. However, if all states required such a premium it would cost a company about $3,500.00 a year before they could sell their product throughout the United States. Exorbitant license fees and bonds are useless. They serve no purpose, do not protect the hog-raiser, are a heavy tax on the producer and only serve to produce some revenue for the state and create some business for the bonding companies.

In the fourth classification we find laws passed purely as a protection of the swine industry. Preliminary to issuing a permit to distribute or handle virus in Minnesota the law provides that one must take a course of special instruction and pass an examination prescribed by the Live Stock Sanitary Board. A. U. S. Released product is a good, potent, pure product, and in the future instead of attempting to regulate purity and potency by state laws we should pay more attention to the proper handling, distributing, and use of serum and virus in the field.

The various ways and means of legislating and dealing with this established and proven industry has, in the mind of the laymen and others, tended to create a lack of confidence. The pendulum of state laws has swung too far and must swing back for the good of the swine industry. Legislation arbitrarily attempting to fix distances that serum plants should be located from public stockyards; a maze of commission legislation by state rules and regulations, unfathomable and vague to the layman; and excessive bonding laws together with license fees, arouse suspicion in the mind of the consumer, the hog-raiser, as to the intrinsic value of anti-hog cholera serum and virus. We should guard against unreasonable legislation and class legislation for the favored few within a state, and advocate the proper use of pure and potent U. S. Released Serum. We admit the federal government has handled the licensing and testing of serum and virus in a most practical and scientific manner, that the products of the U. S. licensed serum plants are good and wholesome, pure and potent products which have passed the government test.
The serum producer is a necessity. Thousands of dollars are annually used in the industry, and the reputation of the producer is behind his products.

We should leave the question of purity and potency to the Bureau of Animal Industry, establish confidence in the use of U. S. Released products, and the state can best serve the community by encouraging vaccination of hogs with U. S. Released serum and virus to prevent hog cholera.

A MEMBER: I move we adjourn.

Motion duly seconded.

PRESIDENT DUNPHY: Before adjourning there are one or two announcements that I would like to have made.

SECRETARY CAMPBELL: The Chairman of the Executive Committee wants the members of that committee to get together at this desk immediately after adjournment with regard to the applications that have been read. If you have any information you think that committee ought to have regarding any applicant, please supply it at that time, also, do not forget to register in Room 1811.

Thereupon, a recess was taken until two o'clock P. M.

FOURTH SESSION

Tuesday, Dec. 2, 1919.

PRESIDENT DUNPHY: The meeting is now open for a discussion of the hog cholera or the swine disease program.

DR. CAHILL: From time to time there has been a proposal mentioned before this association to the effect that all papers before prior to being presented at this association should be presented to the Executive Committee, or a similar committee for censoring. It has been done in a great many institutions, in fact in almost all of the scientific associations. Personally I have felt, as I think the majority have, that such a proposal was not necessary in this association, and I have had no occasion to change my mind very radically until this morning, and I think, Mr. Chairman, that if ever this association was presented with the necessity of having such a rule in effect, we have had it presented to us this morning. The last paper that was presented to us this morning again brought up the question which has been discussed at these meetings so many times, namely commercialism. I feel, Mr. Chairman, that when such a vital problem is attacked, that when an association of any commercial kind enters into a scientific association, and, as a body, attempts to tear down the work which the individuals in the scientific association are doing, simply because it interferes with the financial gain of a certain crowd of men, I say it is high time that this association should take some official cognizance of that condition.

Now, Mr. Chairman, the thing I am particularly anxious about, is to avoid, a repetition of the condition which we had three years ago, at this meeting, when the discussion was finally stopped by one member moving the Chair that this discussion between the pros and cons of commercialism be stopped. I hope that that will not be the result of what I am about to say today, but what I do want to say is this, and I am saying it in fairness to several persons who may or may not be
present, as well as for myself, and that is Mr. Boddington, in speaking for the association known as the Associated Serum Producers, was not speaking for all serum producers. I want to say that there are certain serum producers, and certain biological laboratories in this country who are glad indeed to meet every requirement which will insure the safeguard of anti-hog cholera serum and hog-cholera virus when it comes into the hands of the consumer; and they are glad indeed to cooperate with every regulation which has been placed in effect in any state of this union, for by doing so, that regulation further safeguards the interests of the practicing veterinarian or state official.

I want to state further that in self-defense, and in defense of the state of Massachusetts, which was so violently attacked this morning, and I might say that my personal connection with it is due to the fact that when that regulation was passed I was in charge of the control work in Massachusetts. I know the minutest details connected with that case. I know, Mr. Chairman, what Mr. Boddington may not have known, and I feel that I want to give Mr. Boddington the benefit of the doubt, and I feel that he was not absolutely dishonest when he presented his interpretation of the conditions this morning.

Since, however, it has been challenged, I want to defend the method which has been in vogue in Massachusetts for six years, and I call your attention to the fact that the results of the crusade against anti-hog cholera which has been conducted for six years in Massachusetts, the results which have followed, have been the best results which have followed any organized campaign against hog cholera in the world. The percentage of mortalities in both infected and non-infected areas which have been immunized against cholera has never been as low in any other crusade. Another matter which I would have Mr. Boddington take cognizance of is the fact that it was found necessary to protect the live stock owners of the state of Massachusetts, and since then, in some other states, by retesting anti-hog cholera serum and hog cholera virus for potency after it had passed the government tests.

Now, please understand that I am not inferring that the government test for impotency is not a satisfactory test, but I do state, and there are men in the room, who understand the production of anti-hog cholera serum, that know that some serum which may pass a satisfactory potency test is of little value when used by the veterinarian in the field. Hogs were lost by the thousands in that state because of certain serum which had passed the government test, because that serum when used was not potent, and it was for that reason that that method which was so attacked this morning, was instituted.

I might say before passing, that this is no case of a monopoly of the associated serum producers. One of the companies which Mr. Boddington represents was given a permit to ship serum and virus into Massachusetts, provided it was capable, or provided it was found, on test, to have the necessary qualifications. The serum and virus tested had passed the government tests. The serum and virus presented to the state of Massachusetts was rejected because, although potent, it was impossible to use such serum, because of its impurities. It contained hundreds of thousands of bacteria, capable of reproducing disease, a condition which has not been taken care of by the present tests.

Now, these are some of the reasons why states need regulation and why some states feel they cannot accept all serums and why some states
know that the statement made this morning that all serum is alike, is not accurate.

Now, if I may have one more word, Mr. Chairman, so I may not be misunderstood, and so I may not be accused of only starting an argument and leaving that for what it may be worth, that the present Commissioner may not be misunderstood and so that you may know why the method is continued, I want to say in reference to several papers presented this morning, and as a member of the committee which presented one of the reports, I feel that a slight advance has been made to urge the condition which exists today, and which conditions have proved so perplexing in the past year and a half. I feel that Dr. Kinsley's report, or the special committee, furnishes us more hope for the future. I hope that the committee will be continued, Mr. Chairman. The committee has not had an opportunity to do more than start an investigation of such a vital problem. I believe it is a most vital problem which is confronting the average practicing veterinarian today. We all know that the control of hog cholera is not as simple as it appeared to be a few years ago. Some have one idea and some have another. I think some one federal authority, whether it be a committee of this association or the Bureau of Animal Industry, or any central branch should be set to work, and that means research work, to standardize the information taking all the good and discarding all information which has been arrived at too hastily, and of an unscientific character, that one federal authority is going to perform one of the best pieces of work which could possibly be performed by any central organized authority, and I do hope that work will go forward, and I do hope that none of us will be too hasty in our conclusions.

I feel that the pendulum has swung too far one way. We all know that cases are being called hemorrhagic septicemia or enteritis which are hog cholera. I know there are certain cases called hog cholera where the animals have shown symptoms and lesions somewhat different from those which we are accustomed to find in hog cholera and I know I can inject these pigs with virus and have them proved susceptible to hog cholera, so it is a great big wide serious problem. I do not think we ever needed the solving of it as badly as we do today, and I think that all the different gentlemen who have presented papers and who have been doing work constantly for years on this subject, I believe that we owe them a debt of gratitude until this thing is cleared up. They should continue their work, and I hope that in the next year they may be able to give us more detailed information. In the meantime I will just urge one thing, that we always remember the hog cholera danger, and that we be not too hasty in our conclusions, and that we be not too quick to condemn a practicing veterinarian who is unable to make a diagnosis.

DR. BAHNSEN: I beg to refer to the recommendation of the committee on hog cholera control, in which they recommend that a meeting be held of state and federal sanitarians engaged in live stock sanitary control work, in order to thoroughly go into all the facts of hog cholera control work. I think this is by far one of the most urgently needed meetings that we could possibly endorse, and I would like for this association to go on record and urge the federal government to call a meeting of that kind. This should be a meeting not for a day or so, not a meeting at which each and every disease of live stock should be under discussion, but an exclusive hog cholera control meeting, and I hope
that this association will make a recommendation to the Bureau of Animal Industry to call such a meeting.

President Dunphy: The Chair will entertain a motion at any time during the meeting to that effect.

Dr. A. B. Niven: I have discussed these diseases with many of you that are here today at different times, and there have been so many ideas expressed that I am at a loss to understand just where we are. I am a private practitioner at the present time, specializing in hog diseases almost entirely, and I have had all kinds of trouble. For the last three years I have been doing a little experimental work as a practitioner, and I find that sometimes when we think we have cholera, we have not. I have always had an idea that if you have a herd of hogs that are sick, showing symptoms of cholera, and they have not been immuned, you can eliminate the trouble by giving them serum and virus. The idea of giving serum alone to eliminate cholera is not practicable, because the hog-raiser will not stand for it. He wants to have it settled once and for all, even if he loses a few hogs, so as a rule, I always give them plenty of serum and virus, because the other fellow pays for it anyhow, and it has been my experience in the hog territory, that they do not object. Three years ago we had considerable trouble from mixed infection. It infected every kind of shoat, good, bad and indifferent, under all kinds of sanitary conditions, good, bad and ideal, Later in the year it commenced infecting the larger hogs. It will attack a herd of hogs under various pathological conditions and the old sows will die without any warning. They will be found dead in the morning, sows that have been all through cholera, showing all kinds of lesions, and one hog will show one lesion and another hog another. I have tried all kinds of treatment that were ever thought of or suggested, vaccines, internal antiseptics and external antiseptics, and all kinds of worm medicine and all kinds of dieting. On the whole we have had fairly good success, but it is an awful job, and in some cases we find herds where they practically all die. Nothing will check it. In another herd of hogs, probably an application of two or three vaccines will check it immediately.

Then after six or eight weeks, they all break out again with another infection, showing another lesion, and you have the same trouble over again.

I would like to hear from some of the others that have had similar experiences, as to their results. I have been told by some who have been experimenting that it is a virus that is back of all this trouble. I think probably it is, but still again we could take these same hogs that we have immunized, the same sores and the same virus, and they stand up under that, and it does not look feasible, so that we have a condition here that we have to work out, but we are not making very fast progress. It is worse this year, by far, than it ever was before. More hogs are dying. Whole herds in some places are cleaned out, and again it will check readily. Once in a while it checks itself.

Dr. Stange: Mr. Chairman, before we go into a discussion, I believe we would all like to hear a few words from Dr. Dorset.

President Dunphy: Dr. Dorset, you are called for.

Dr. Dorset: Mr. President, I rather regret that Dr. Stange has suggested that you call upon me, because I really feel that I can add little to the discussion. I have listened with a great deal of interest to the
papers this afternoon. I think we are very much indebted to the two committees who have gone so carefully over this subject, and attempted to bring some order out of the chaos that exists with respect to swine diseases at the present time.

I confess that for the last year or so, I have felt very much puzzled with respect to hog diseases in the United States. Prior to that I thought I had a pretty fair grasp of the diseases that existed, and were of importance.

Now, in the last year or so we hear of almost a multitude of new diseases, that is, new names. We hear that hogs have the "flu;" we hear of mixed infection in swine. We hear of shipping fever and hemorrhagic septicemia, and a number of other diseases. Coincidently with the springing up of these new diseases we have had a large number of bacterins, and vaccines put upon the market, intended to combat these conditions. We have had hemorrhagic septicemia bacterin, the mixed infection bacterin, the supestifer bacterin, etc.

I wonder whether we have a number of new diseases of hogs, or whether these new diseases are really old friends with new names. If we judge by the bacterins I would be inclined to think they are our old friends, because the bacterins are prepared, as you know, from organisms, bacillus suisepticus, generally regarded as the cause of swine plague or pneumonia in pigs and the supestifer which we know is the old hog cholera bacillus. We know it is found frequently in pigs, and we know that hog cholera itself is a mixed infection; that hog cholera itself is never a pure infection with filtrable virus, so I say I have been puzzled indeed, and I really feel that I do not know enough at the present time to express myself positively with respect to these conditions that we hear of now in the United States.

It seems to me, as has already been pointed out this morning, that what we need is very careful research work, to segregate and define these different diseases. There is no doubt in my mind now, and in fact there never has been any doubt in my mind, but that there are other infectious diseases in hogs in the United States than hog cholera, that you do have independent infections, undoubtedly, independent of the filtrable virus. At the same time I am quite sure, as other speakers have stated, that the pendulum has swung too far away from hog cholera in many cases. Certainly in many cases during the past year, large numbers of hogs have been lost from hog cholera through failure to use serum in time. The diagnosis is hemorrhagic septicemia or mixed infection, or some other disease, and bacterin of some sort is administered, and the veterinarian does not realize that he has a case of hog cholera until the herd is gone too far to be benefited by the serum treatment. Really, at the present time, it requires, on the part of the veterinarian, splendid judgment, almost omniscience, I should say, to make a correct diagnosis. I am sure that the practitioners here are very much worried, troubled and uncertain with respect to their diagnosis, and I must say that I do not believe we know enough at the present time to help them very materially.

It seems to me, with respect to the use of bacterins, which have been so widely used, that they are used with very considerable expense to the farmer. They sell, I believe at from 10 to 25 cents per dose, not including the cost of ministration, and a man with a big herd of hogs may pay several hundred dollars to have these vaccines injected into his hogs,
and I really feel with respect to the bacterins, that we have got the cart before the horse; that we are endeavoring to treat diseases with certain microorganisms, when we don't know yet what the causes of these diseases are, and that is certainly, to say the least, unfair.

I believe, as I said before, that we need more research. The Bureau of Animal Industry, with the rather limited appropriations available to it, at the present time, has undertaken a study of this subject, but it is not a question that can be decided promptly over night or in six months, nor perhaps even in a year. The question is very puzzling. I hope that all states that have funds for research work on hog cholera will themselves engage in researches so that we may get a foundation which will enable the veterinarian to diagnose these diseases in the field. I really believe that it is almost impossible for the practicing veterinarian in the case of sick hogs in the field to exclude hog cholera, even though, in many cases, they have what they call the "flu," or hemorrhagic septicemia, or mixed infection. It is undoubtedly true that hog cholera virus is very mild in virulence at times; that it does not always produce great losses in hogs. I had the opportunity to observe a case of that kind in a herd of some 50 or 60 pigs. It was a case in Iowa which Koen had under charge. The pigs were segregated into a number of different lots. One lot was given the simultaneous inoculation, and one lot was given serum alone, and one I believe was given a mixed infection bacterin, and still another lot was fed or given a certain amount of copper sulphate. These pigs had shown some symptoms, though not very characteristic, of hog cholera, but the diagnosis was not absolute. The result was that practically all of the pigs in that bunch did well. There were no deaths, or practically no deaths after treatment, and yet blood was taken from that herd and examined carefully and passed through several pigs, and finally brought to a high virulence, undoubtedly hog cholera, and we believed, and I believed that in that herd there was a filtrable virus of low virulence, which was probably the inciting cause in that particular outbreak. That is only one case, but it shows the situation that prevails.

In conclusion I will say that in my opinion very great care ought to be used by the veterinarian in declaring that hog cholera is not present in a herd. He knows, as far as the serum is concerned, that the serum will protect the hogs against cholera. If he discards that serum and gives bacterins on the supposition that it is something other than hog cholera, he has not the assurance that the bacterins will protect the hogs from the other diseases, or the thing that he is trying to treat, and therefore a great deal of caution should be used, and I believe the hogs ought to be given the benefit of the doubt, unless the veterinarian is quite sure that it is not hog cholera, and should be given the serum early in the disease.

President Dunphy: This discussion is very interesting, and no doubt could be continued profitably for the rest of the afternoon, but I deem it wise now to take up the abortion disease question. Before leaving the subject of hog cholera, I must say that I feel that Dr. Bahnsen's suggestion in regard to the Bureau calling a session of people interested in hog cholera work, would be a judicious thing to do, and I hope that a resolution to that kind effect will pass this association.

The next is a report of the Committee on Abortion Diseases, by Dr. Ward Giltner, Department of Bacteriology and Hygiene, M. A. C.
DR. WARD GILTNER: Mr. President and gentlemen: I have three parts of this report to make, and I hope it will not take long. We submit the bibliography as we have in the past two years, and we again invite you to supplement it if we have made any omissions.

I want to present next a discussion on the naming of this disease, and I want to state that this is presented not for the committee, but independently. The committee assumes no responsibility for this brief discussion on the naming of the disease.

HOW SHALL WE NAME BOVINE ABORTION DISEASE?


The committee on abortion of the U. S. Live Stock Sanitary Association asked in its report for 1918 that the association go on record as affirming that: "Bovine infectious abortion is a dangerous communicable disease of cattle due to the Bact. abortus." Dr. W. L. Williams objects, basing his objections in part and emphatically on the basis of impropriety of the term which we have employed to designate the disease, although it must be confessed that the term employed by your committee is quite generally accepted except that the word infectious is sometimes replaced by contagious or epizootic. We think that infectious, as clearly implying microbial causation and that only, is preferable.

In criticizing the committee's report, Dr. Williams says: "The committee has adhered to the usual custom of not defining infectious abortion. The adjective contagious or infectious has become superfluous and actually mischievous, by keeping alive the fiction of a non-communicable abortion. The name causes even more serious confusion and leads to much fruitless controversy, because it unavoidably carries with it the assumption that all cases of abortion due to infection or contagion are inevitably due to one specific infection, and to one only like glanders, which can be caused by the bacillus malleus alone.

"So long as the present name is tolerated, no fairly acceptable definition is possible. Contagious or infectious abortion neither directly nor remotely expresses the character of the problem. Abortion is not a disease, nor is it in the ordinary sense a symptom or a lesion. Abortion consists of two incidents—the death of the fetus and its expulsion from the uterus."

Williams and Carpenter in the 1917-1918 Report of the New York State Veterinary College continue in the same vein:
"At present there is but one known cause of abortion—bacterial invasion. Whatever the faith may be in other causes of abortion, the ways in which they operate are at present each and all incomprehensible. A clear conception of abortion demands that, in order for it to occur, a cause must exist which will bring about the death of the fetus and its expulsion from the uterus.

"So far as known all abortions, except those due to the removal of the corpus luteum of pregnancy or those induced by surgically breaking down the uterine seal and invading the uterine cavity, are due to the action of disease-producing organisms upon the fetus and uterus. In every case recorded in veterinary literature where an animal has aborted and has been promptly slaughtered the uterus and fetus or fetal membranes have uniformly shown undeniable proof of infection as the fundamental cause.

"In order that abortion may occur, a disease must involve simultaneously the fetus, and the uterus of the mother. The life of the fetus must be destroyed and the uterus must become so affected that it will contract and expel the dead fetus. The death of the fetus without expulsion is not abortion, but only results in maceration or mummification, though the death may be, and usually is, due to an infection capable of causing abortion. Occasionally the infection, without causing the death of the fetus, so involves the uterus as to cause it to expel the living fetus. This is designated premature birth, though due to the same infection as that leading to abortion."

It is not our purpose to engage in a controversial strife with the eminent obstetrician and surgeon in a matter which is neither obstetrical nor surgical fundamentally, nor do we wish to inaugurate a series of polemics. Neither would we emphasize nor magnify the utterances quoted above except for the fact that their chief author has classified the students of abortion disease into two schools of thought, one of which believes as he does on some of these matters while the other does not. It is to be devoutly hoped that the former school if such there exists is characterized by a limited following. It is our purpose here to throw some light on the matter of a proper designation of the serious bovine disease commonly called abortion disease.

Words are used legitimately only to convey thought not to conceal it or to confuse issues. The accepted source of word definitions is the dictionary. The New Standard Dictionary (1913) defines abortion: "Noun 1—The act of bringing forth young prematurely; in a loose way miscarriage. In the human
subject, as usually construed in law and medicine, abortion is the expulsion of the product of conception at any period of gestation before the fetus becomes viable. In a stricter sense it is 'The expulsion of the ovum before the third month of gestation, as distinguished from miscarriage.' The period is variously limited by other authorities. The word abortion is also sometimes loosely used to mean criminal abortion. 2. The fruit of the act of abortion; hence any misshapen or defective thing. 3. Biol. The partial or complete arrest of development of an organ. 4. Failure in anything during progress and before maturity; as in an enterprise or project. (Ety. from ab, from—orior, to grow, i.e. To grow from the normal)."

A careful study of the dictionary definition of the word abortion clearly shows that the word describes a condition in which there is failure of proper development. Employing the word in this sense we find that it is ideal to describe what happens in the disease under discussion. There is a failure of the fetus to properly develop; death, expulsion, retention of fetus or afterbirth, and complications of whatever nature are secondary. Probably most cases of sterility are cases in which there is a failure of development in the very earliest stages of the life process; in carrying the fetus to full term there may be and is a failure of perfect development in the disease under discussion. There is nothing in the meaning of the word abortion to require that the fetus be dead or that it be expelled from the uterus only that it fail to properly develop. If it fails to develop immediately after the ovum and spermatozoon unite, if it dies in the uterus and is not expelled for a prolonged period, if it is expelled at any time during the normal period of gestation without having properly developed (and if there is an infection or other diseased condition of the uterus, it probably will not develop normally), then in each case we are dealing with an abortion. No word could be more descriptive of the whole group of conditions with which we are dealing under the heading, abortion and sterility. It is extremely unfortunate that anyone should attempt to limit the word abortion as descriptive of only one of these conditions.

To say that abortion is not a disease is to invite revolution in our entire medical nomenclature, provided, of course, that we accept the proper definition of the word. The causes of failure of the fetus to develop, abortion, must of necessity be varied and most certainly need not be directly microbial in nature, hence there is a non-infectious abortion and all abortions are
not infections. On the other hand abortions are very frequently, most frequently in cattle nowadays, due to direct microbial causation, hence infections. Infections pertain to cause microbial in nature; contagious, to communicability, hence variable in nature; epizootic, to prevalency, hence of limited application. It is clear, therefore, that the word infectious, being universally applicable, is the correct limiting adjective to employ. To use the expression infectious abortion does not imply one specific cause and one only any more than the expression septic sore throat or infectious mammitis implies a single etiologic microbial agent. The cause of caseous degeneration in the tissues or tubercle formation is not Bact. tuberculosis alone, although this organism does cause a specific type of degeneration detectable only by the skilled pathologist in many cases, but detectable with a certain degree of accuracy by the clinician by means of certain specific tests, as the tuberculin tests. So with infectious abortion, it is not always due to Bact. abortus (Bang) but is usually so caused, and when so caused there may be and is difficulty in determining the specific character of the pathological process, although some light has been thrown on this matter, but there are specific reactions as regards the body fluids and perhaps others. When interpreted by those who desire to come out of the wilderness of verbosity, contentiousness, and personal interest, the records of research, observation, and practical experience set forth, with startling luminosity, bovine infectious abortion as a dangerous communicable disease of cattle due most frequently to Bact. abortus (Bang), or to put it in another way, there is in this and in other countries preying upon the cattle industry a dangerous communicable disease caused by the Bact. abortus (Bang). We can suggest no better name for this disease than infectious abortion and pending the adoption of a better name the failure to make one available is a poor excuse for not taking remedial steps to control the disease.

Many of us will agree with E. M. Robinson of the Union of South Africa that Dr. Williams makes a good many statements that appear to be too dogmatic; but we cannot object to dogmatism as being nearly so dangerous as the juggling with the meaning of words, placing thereon limitations by means of which to build up a false but formidable structure of suspicion and distrust where there is needed the construction of an edifice of optimism, hopefulness and helpfulness. May we ask that the association accept for the time being the term infectious abortion as applying to the disease complex encountered in nearly every country where there is a cattle husbandry and
because there are other possible ways in which an infected bull may infect the cows with which he comes into contact than through the act of copulation.

The two only definitely proved channels through which abortion bacilli are expelled from the bodies of infected cows are the udder and the genital tract, through the former often continuously for long periods of time and through the latter intermittently and for relatively short periods of time. Hence, whatever other precautions are taken, the greatest care should be used to prevent contact between materials from the udders or genital tracts of actually or possibly abortion-infected cows and susceptible cattle. For this reason the use, when they can be provided, of special maternity stables for cows, is recommended, and it is strongly urged that extreme precautions be taken against the dissemination of infection through the agency of skim milk, whey, etc., returned to the farm from creameries, cheese factories, etc. To this end, we recommend the universal pasteurization of dairy by-products distributed from the factory to the farm.

Regarding the treatment of the various conditions associated with orsequent to so-called infectious abortion disease, like retained placentae, temporary or permanent sterility, inflammation of the uterus, etc., it should be generally recognized that they require careful treatment, such as they can receive only at the hands of intelligent, thoroughly trained veterinarians. There is no doubt but that the proper treatment of actual cases of abortion disease, of the sequelae of the disease, and of the pathological conditions due to secondary invaders, or microorganisms which seem to establish themselves in tissues devitalized by the pathological processes of abortion disease, will greatly reduce the number of abortions, the number of cases of sterility and other factors of loss.

Prominent among the things that can be done, in the light of our present knowledge, to check abortion disease, is the education of the owners of live stock. They should be taught in every possible way that it pays to fight this plague vigorously; that we are gradually acquiring the knowledge on which the economic direction of the fight depends; that it is only through cooperation between all those persons who are interested in the conservation of food-producing animals that rapid progress toward the desired goal can be made, and that, though our knowledge remains far from complete, there are many things we can do without fear that we are wasting our time and substance, and with the assurance that our efforts will be richly
Since our knowledge of so-called infectious abortion disease does not justify us in recommending far-reaching radical measures that would impose severe and expensive restrictions on the movements of live stock, we conclude that it is sufficient to justify the enactment and enforcement of laws against the misrepresentation of abortion-infected cattle that are sold for other purposes than immediate slaughter.

We endorse the complement-fixation and agglutination tests for Bang's disease as reliable means of determining the presence or absence of infections in a herd when used by competent individuals, but we are not yet able to interpret fully the reactions in so far as the individual animal is concerned although light is being thrown on this matter by the researches of a number (Fitch et al., Smillie, et al.). These tests, especially the agglutination test, the simpler of the two, should be used more widely to protect abortion-free herds against abortion-infected cattle. The suspensions of abortion bacilli and the samples of blood needed to make the agglutination test, can be kept without deterioration for fairly long periods of time; hence, there is no reason why state veterinarians, state experiment stations and agricultural colleges, should not at all times be kept in readiness to make abortion-disease agglutination tests, and no veterinarian who is a creditable member of his profession should find it difficult to draw samples of blood from cattle that will be sufficiently clean and sterile to make it possible to ship them from any portion of any state to any other portion, or, for that matter, from any portion of the United States to any other portion, in a much shorter time than will be required for such samples to become unfit for use in abortion agglutination tests.

Wherever such tests can be made by state or other officials or in state or other official establishments, for a small or a nominal fee, or preferably, free of charge, cattle owners should be instructed in various ways, which we do not believe it necessary to attempt to elaborate, that abortion-free herds need the aid of such tests to keep them free from abortion disease in the same manner that tuberculosis-free herds need the tuberculin test to keep them free from tuberculosis. However, these tests should not be used to the exclusion of other methods valuable in the determination of a diagnosis of the disease.

Regarding the significance of the bull as an agent for spreading abortion infection, though no unimpeachable evidence has been obtained to prove that the bull infects cows at the time of copulation, it would be foolhardy to take liberties with infected bulls, bulls from infected herds, or promiscuously used bulls,
recognized, manifest symptom, is due to a definite, well known microorganism, and that this organism is the Bang bacillus.

The most common habitat of the Bang bacillus appears to be the udders of infected cows, in which it may persist for months or years. The nature of the pathological process in the udder is unknown but is indicated by (Cooledge) an increased cellular content of the milk. It appears that this statement is equivalent to saying that in Bang's bovine abortion disease healthy carriers are very numerous. The full significance of this statement as regards the spread of the disease among the domesticated animals cannot be estimated at the present time although the work of Huddleson indicates that calves are not infected by drinking raw milk from such udders and the work of Good should warn against such milk in the diet of pregnant cows; and as regards human infection, the work of Cooledge and others fails to indicate any danger from this source.

It has been shown (Schroeder and Cotton) when abortion bacilli are present in the udder, that they may reach the gravid uterus, and, irrespective of whether the cow calves normally or abnormally, whether she carries her calf to full term or expels an immature fetus, that, immediately before and at the time of parturition and shortly after, she may expel abortion bacilli via her vagina.

These facts indicate that one of the very important things we should do in our efforts to check the spread of abortion disease, is to discover and if possible control the movements of the seemingly healthy carriers and disseminators of the infection.

Cows that actually abort, or have retained placentae, or have a discharge from the genital passage, easily attract the attention of their owners. The owners of such cows should be taught how much harm such animals may do if they are introduced into abortion-free herds, and should be instructed never to sell them without giving their purchaser a true statement regarding their condition. Owners of abortion-free cattle should be cautioned against the purchase of such cattle, and should be instructed regarding the apparently healthy carriers of infection.

If it is found, after proper instructions, through circulars and bulletins issued by various official establishments, such as the offices of state veterinarians, state experiment stations and departments of agriculture, the Federal Bureau of Animal Industry, etc., that abortion-infected cattle are misrepresented at the time they are offered for sale, it is recommended that laws, with severe penalties, to check this evil, be enacted by state legislatures.
characterized by the interference with the proper development of the fetus and usually associated with Bact. abortus (Bang).

Dr. Giltner: I will now give you the brief report of the committee, and this report has the approval of the five members of the committee, unless I have jugged it somewhat since they last saw it. It is in immaterial to the committee, whether the report of the committee is discussed or not, but if you do not wish to discuss the report constructively or destructively, I would suggest that you make your notes on the paragraphs, as I read them, and after the introductory paragraphs I will designate them seriatim.

I might say here, since our last report, some states in the Union have taken legislative steps in connection with this disease, and we believe that legislation or regulation might well be guided by this report.

Report of Committee on Infectious Abortion.


At the last annual meeting of the association your committee presented a report which was referred back to it for further consideration. Such further consideration as was implied in the act of the association has been given the report and your committee has made a very earnest effort to determine upon a course of action against Bang's abortion disease that will meet with the approval of the entire association.

We, therefore, recommend that the association go on record as endorsing the following statement as constituting its position in the matter of the so-called bovine epizootic abortion disease, being guided only by confirmed, or virtually confirmed, facts and some of the conclusions to which they point.

While it cannot be doubted that all abortions among cattle are not due to the Bang bacillus of infectious abortion, as is specifically shown by the investigations of Stockmen and M'Fadyean and those published by Theobald Smith last December in the Journal of Medical Research, under the title of "Spirilla in Infectious Abortion of Cattle," there seems to be no satisfactory reason to doubt that the great, wide-spread important plague which we have named, "infectious or contagious abortion disease of cattle," has, as its primary, essential, specific cause, the Bang bacillus of infectious abortion.

This statement does not seek to deny the possible occurrence of numerous other affections in which the reproductive organs of cattle may be involved, and which may be either independent affections or sequelae to the disease produced by the Bang bacillus or by the Spirillum described by Smith. It means merely that the great plague which bears the name abortion disease, and of which an abortion is the most impressive and most widely
rewarded; whereas failure to act on the basis of present knowledge will be fatal and paramount to criminal negligence.

WARD GILTNER,
E. S. BAYARD,
G. M. POTTER,
E. C. SCHROEDER,
T. H. FERGUSON.

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PRESIDENT DUNPHY: Gentlemen, there are five members of this committee, and two of these members have papers—one the report you have just heard read, and the next paper is "A Memorandum Relative to the Etiology of So-called Infectious Abortion Disease of Cattle." I suggest that we have those two papers and discuss them together before the report is accepted, if that is acceptable to the Association.

A motion prevailed to that effect.

PRESIDENT DUNPHY: I will now call upon Dr. E. C. Schroeder, of Maryland, Superintendent of the U. S. B. A. I. Experiment Station, for his paper on "A Memorandum Relative to the Etiology of the So-called Infectious Abortion Diseases of Cattle."

MEMORANDUM RELATIVE TO THE ETIOLOGY OF SO-CALLED INFECTIOUS ABORTION DISEASE OF CATTLE

By E. C. Schroeder, Bethesda, Md.

At the beginning I believe it desirable to say that the disease about which I shall speak is the so-called infectious abortion disease of cattle obviously due to the Bang abortion bacillus.

It is in no sense my wish or intention to discredit the belief, or rather, the inference, that abortions among cattle, and conditions which lead to abortions, may be caused by germs like the spirillum of Smith and the vibrio of Stockman and McFadyean, or by various septic and pyogenic bacteria, or by the occasional pernicious activity of microorganisms which commonly inhabit animal bodies as commensal parasites, or even by the absorption of toxic substances; but, unless I am greatly mistaken in my valuation of the known facts, we are reasonably entitled to conclude, no matter how many different causes may be responsible for abortions, that only one, common, widespread, infectious abortion disease among cattle has been definitely proved to exist, and that this is the disease of which the Bang abortion bacillus is the prime, etiological factor.

I frankly admit, since knowledge is progressive and human conceptions are very mutable, that the discovery of more facts may require, in coming time, a modification of this conclusion, but that is a matter we must leave to the future. We are dealing with the present, and the conclusions of any period of time, in the full measure to which they merit approval as a serviceable and rational basis for practical action, should be in harmony with the known facts of that period.

Now, recognizing that abortion disease among cattle may have many causes, the individual nature and importance of which, either or both, remain to be determined, and one cause that has
been proved to be both common and widespread, namely, the Bang abortion bacillus, and keeping in mind that efforts guided by a knowledge of the etiology of a disease promise the best results when its control or eradication are undertaken, it seems that it would be advantageous to survey some of the major facts we know about the Bang abortion bacillus and its relation to the animals it attacks.

The bacillus, so far as we have been able to learn, under natural conditions, is an obligatory parasite, which does not produce spores or special forms that are strongly resistant against the germicidal properties of light and drying. Hence, after it is expelled from the body of one host it does not again multiply until it has entered that of another, and it cannot long survive in a free state unless it is well protected against the inclement features of its extra-host environment, and such protection would require that it should be imbedded in a moist, opaque, fairly voluminous and practically neutral medium.

The natural hosts of the parasite are cattle. It may also live in the bodies of other animals, as, for example, guinea pigs, in which it causes extensive, characteristic lesions of disease; rabbits, in the livers of which it may long persist without causing manifest changes; hogs, in which it is being reported with increasing frequency as a cause of abortion disease, but it is reasonably certain that its specifically true hosts are cattle, and that its parasitism in the bodies of other animals is incidental and without true significance for its real perpetuation. In other words, we may say, though the Bang bacillus can live and multiply in the bodies of other animals, it would probably be doomed to early extinction if it could be excluded from those of cattle, in precisely the same sense in which the bovine type of tubercle bacillus, which attacks many different species of animals, the human included, would soon become extinct if it could be excluded from the bodies of cattle.

Taking the host-relationship and the general nature of the abortion bacillus into consideration, we may conclude that it is an organism with which it is not difficult to deal during its extra-host period through the practice of scrupulous cleanliness and the use of simple disinfectants, and that the disease it causes is an evil which spreads in the great majority of cases, quite probably, only through fairly intimate contact between infected and susceptible cattle.

Like many other parasites, bacterial as well as those of higher order, the abortion bacillus shows a marked preference for
special regions of the bodies of its hosts. Its commonest habi-
tat in the bodies of cattle, and the organ in which it persists
longest, is the udder. Next to this is the pregnant uterus, or,
more definitely, according to an investigation recently pub-
lished by Dr. Theobald Smith, the outermost layer of the pla-
centa. It also, but less frequently, inhabits the seminal vesicles
and epididymides of bulls.

In the udder, multiplication evidently is slow, and in the
pregnant uterus rapid. About its multiplication in the repro-
ductive organs of bulls we have no data on which we can base
conclusions.

When the udder is infected, in practically all the cases ex-
amined, the supra-mammary lymph-glands are also infected,
and this is just what should be expected since they are the
glands through which the lymph system drains the udder. The
occurrence of the bacillus in these glands indicates that it may
enter the lymph and blood streams from the udder, and the
failure to detect it in the numerous tests that have been made
to discover it in tissues from all other parts of the bodies of
cows with infected udders, like blood, spleen, liver, kidneys,
brain, bone marrow, synovial fluid, ovaries, fallopian tubes,
lymph-glands, etc., seems to prove that the bodies of cows gen-
ernally, apart from their udders and pregnant uteruses, do not
provide a suitable habitat for it.

Presumably, when the abortion bacillus penetrates deeper into
the body from an infected udder, unless it reaches a place like
the pregnant uterus, where it can establish itself and multiply,
it is rapidly destroyed. That it can reach the pregnant uterus
from the udder is proved, first, by inoculation experiments, in
which the pregnant uterus was infected through the introduc-
tion of abortion bacilli into the udder through the teats with
a milking tube; and, second, by the frequency with which the
placentas and uteruses of cows with infected udders contain
abortion bacilli even when such cows are apparently healthy
and calve in a seemingly normal manner.

The abortion bacillus cannot be proved to be present in the
udder of every cow that is affected with abortion disease, neither
can it be proved to occur in the pregnant uterus of every cow
that has an infected udder, but this much is true, in the udder
it may persist anywhere from a few weeks to seven or eight
years, and, while it persists, if the examinations thus far made
are reliable, at least half of the parturitions, though they may
be manifestly normal in character, are accompanied by the dis-
semination of abortion bacilli from the uterus via the vagina. And this is a matter of exceptional importance, because it clearly shows that seemingly healthy cows are often long-lived carriers of abortion bacilli, and that such carriers, in addition to eliminating abortion bacilli more or less continuously with their milk, in a large proportion of cases expel them in a dangerous way during and shortly after, and probably shortly before, calving.

Studies relative to the occurrence of abortion bacilli in the non-pregnant uterus have given the following results. When an infected cow has aborted or calved, irrespective of whether the calving is or is not attended by sensible, abnormal phenomena, the uterus and the material discharged from it may, and in a large proportion of cases does, contain abortion bacilli. The infected condition lasts from a few days to a few weeks. As a common rule, tests to discover abortion bacilli in the uterus, three weeks after an abortion or a parturition, give negative results, though we have one case on record in which they persisted nearly two months. The latter must be looked upon as a rare exception.

When abortion bacilli are injected directly into the non-pregnant uterus they disappear in a few days, and copious, repeated injections of suspensions of abortion bacilli into the veins of non-pregnant cows, judging from numerous tests made at estrual periods and at other times, do not infect the uterus.

Here we may conclude that the period during which abortion bacilli are disseminated by infected cows in large numbers is limited, because the parasite inhabits only two portions of their bodies, one, the udder, indefinitely, and the other, the uterus, for limited periods of time. From the infected udder the bacillus is discharged more or less continuously in small numbers, and from the uterus periodically in large numbers.

To overcome the danger due to abortion bacilli discharged from the udder should not be difficult. Milk is a valuable product and ordinary economy prevents it from being scattered about promiscuously in a cow stable. If it is accidentally spilled where it may do harm it should be sprinkled with lime or some other simple disinfectant. If it is sent to a creamery or a cheese factory, from which skim milk or by-products are returned to the farm, the skim milk or the by-products should be sterilized before they are fed to animals.

At one time I advanced the opinion that abortion infection might occur through the udder with bacilli drawn into the teats
during milking from the hands of milkers who had previously milked cows with infected udders. But, though I know perfectly well that abortion bacilli reach the uterus from the udder and that abortion disease can be produced by injecting abortion bacilli into the udder through the teats, I doubt whether this mode of infection has much practical importance. It is a possibility that should be kept in mind until further investigations have thrown more light on it, and a danger which I believe can be avoided by washing the hands before going from one cow to another during milking.

The danger due to the bacilli discharged from the uterus when abortions occur and in connection with parturitions, and this evidently is the prime danger, should be controlled through the use of maternity stables. Cows should be moved to such stables the moment they show the first sign of approaching parturition, or the least symptom of what may be a coming abortion, and should be segregated in such stables after calving or aborting until all abnormal discharges from their uteruses have ceased. The products of abortion and the by-products of parturitions should be disposed of in a manner which will prevent the exposure of cattle that are susceptible to abortion disease to them.

The maternity stable removes the cow from the herd during the approximately two to three weeks per annum in which she is very apt to be exceptionally dangerous; the only two to three weeks per annum during which cows affected with Bang abortion disease positively are known to scatter abortion bacilli in large numbers and in a dangerous way. And it is imperatively necessary in this connection to bear in mind constantly that the seemingly healthy carrier of abortion bacilli, the cow which shows no sign of her infected condition and calves in a seemingly normal manner, may be a superlatively dangerous disseminator of abortion germs at and shortly after her time of parturition.

In speaking about the habitat of the abortion bacillus in the bodies of cattle, I failed to say anything about the various portions of the bodies of aborted fetuses and recently born calves in which it has been found, but it does not seem necessary to say much. The occurrence of the bacillus in fetuses impresses me as being similar to its presence in a sponge that has been immersed in a fluid contaminated with abortion bacilli, with this exception, that their digestive tract contains a fluid in which it can multiply and become very numerous. From the
bodies of calves the germ disappears soon after they are born, even though they drink the milk of dams with infected udders.

Regarding calves I would suggest that it may be well to bear in mind that those which enter upon their independent existence from an infected uterus may expel abortion bacilli via their bowels during the first days after they are born, and also that those which are suckled by dams with infected udders may expel abortion bacilli, against which they themselves are immune, via their bowels until shortly after they are weaned. This is simply a suggestion which is not supported by concrete evidence. Tests regarding it have been planned but I cannot predict the results they will give.

The importance of bulls as disseminators of abortion bacilli remains an open question. Investigations reported by Buck, Creech and Ladson of the Division of Pathology of the Federal Bureau of Animal Industry prove beyond dispute that the reproductive organs of bulls occasionally show lesions which harbor abortion bacilli. It is very easy to assume that bulls with infected reproductive organs infect cows at the time of copulation; but, to assume is one thing and to prove is another, and assumptions and confirmed facts are often contradictory. In this case the available evidence does not at all tend to prove that bulls infect cows through the act of copulation.

At the Experiment Station of the Bureau of Animal Industry it was proved that the seminal fluid of one naturally and two artificially infected bulls was contaminated with abortion bacilli. Cows served by these bulls have remained entirely free from abortion disease. Service occurred on neutral ground, where the exposure of the cows to the bulls was limited as strictly as possible to the act of copulation. The injection of suspensions of abortion bacilli into the uteruses of cows just prior to copulation has failed to infect them. The evidence other workers have obtained relative to the infection of the cow with abortion bacilli at the time of copulation fails to incriminate the bull. This is all perfectly compatible with the rapid disappearance of abortion bacilli from the non-pregnant uteruses of cows. The habitat of the abortion parasite in the pregnant uterus is the chorionic epithelium or something else which does not exist prior to or at the time of copulation.

However, bulls must not be regarded as innocent carriers of abortion bacilli, as the expulsion of the bacilli from their seminal vesicles or other portions of their reproductive organs
is not necessarily limited to the time of copulation, and we have no valid reasons to believe that abortion bacilli disseminated by bulls are less virulent than those which have their origin in cows. On the contrary they may be found to be exceptionally virulent strains, as the relatively infrequent occurrence of lesions in bulls, notwithstanding their frequent exposure to infection, leads to the assumption that the exposures which cause the lesions must be to particularly virulent strains of bacilli, or that they must occur at a time when ordinary susceptibility is somewhat enhanced, or that lesions are limited to bulls with abnormally low resistance.

In abortion infected herds it would be a good plan to have separate quarters for bulls, and to have all contact between bulls and cows limited to the time of service, which should occur on neutral ground, or ground which, ordinarily, is not occupied by either the cows or the bulls.

It seems to me that we have in all four sources of abortion bacilli which must be taken into consideration in our efforts to combat Bang abortion disease, and that the four sources are those which I have tried to define, as follovs: the udders of infected cows, the uteruses of infected cows, the discharges from the bowels of unweaned calves produced and suckled by infected cows, and bulls with infected reproductive organs.

Our knowledge on the susceptibility of cattle to the Bang bacilli points directly to pregnancy as the critical period. Calves, as far as we have been able to determine, are immune, at least those which are exposed to infection during the first three to five months of their lives and are known to have ingested an abundance of infected milk prior to weaning, if they are later protected against exposure, not only fail to show symptoms of abortion disease but are also negative to abortion tests. What the conditions are through which a small proportion of bulls and virgin heifers become infected remains unknown.

We know that virgin heifers may harbor abortion bacilli in their non-functioning udders after intravenous injections, and that bulls may harbor them in their testicles after direct injections into the testicles, but these are modes of exposure that do not occur in nature unless it is in the form of rare accidents. The results of such injections merely show that the udders of virgin heifers and some portions of the reproductive organs of bulls may serve as satisfactory places of residence for abortion bacilli.
It is my belief that the susceptibility of cattle for the Bang bacillus gradually increases from calfhhood to sexual maturity; or, more definitely, that the organs of cattle in which the bacillus can maintain itself do not become a suitable habitat for it until considerable progress has been made towards sexual maturity, which practically amounts to saying the same thing twice. If heifers, well advanced towards sexual maturity are persistently exposed to abortion bacilli, or are exposed under conditions which occasionally lead to the ingestion of massive doses, there is no reason for doubting that, from time to time, some of the bacilli may enter the lymph and blood streams through the mucosa of the digestive tract, and this would at once give them a location and significance identical with that of intravenously injected bacilli. Heifers and bulls which become infected, I am inclined to believe, are not likely to be common elsewhere than in severely infected herds and in herds in which sanitation is treated as something of minor importance.

We may conclude here that no special measures for the protection of calves against Bang abortion disease are necessary, and tentatively that it is desirable to begin the protection of all bovine animals, and especially heifers, as they near the time of sexual maturity.

The mode of infection with the cow, clearly does not seem to be through the act of copulation or at the time of conception. Abortion bacilli will not live in the non-pregnant uterus when they are introduced into it at the time of copulation and care is taken not to injure the mucosa, they do not cause abortion disease, nor does the cow afterwards react with abortion tests. and I have no doubt that Professor Williams is right when he asserts that, once the uterine seal has formed, an effective barrier has been erected against the entrance of bacteria into the uterus via the vagina. The danger of infection through the udder I have already discussed, and this leaves open only two other modes of infection, ingestion and inhalation. The latter seems doubtful to me, because the Bang bacillus is a delicate organism and would hardly survive the drying and exposure to light it would have to undergo before it could be sustained in the air in a war that would lead to its inhalation in a virulent state. This leaves ingestion as the likely mode of infection, and experimental evidence proves conclusively that the ingestion of abortion bacilli by pregnant cows causes them to contract abortion disease and to abort. Hence, special precautions should be taken against the contamination of the food and drink of cows with anything that may contain abortion bacilli.
THE NATURE OF ABORTION.

By W. L. Williams, Ithaca, N. Y.

The successful control of a transmissible disease requires a basic knowledge of its character or nature. Some have stated that a disease becomes controllable when its biology or etiology becomes known, but this is not exactly true. The first transmissible disease to be brought under control was smallpox or hog cholera. This occurred prior to the establishment of the etiologic factor becoming known and its causative agent remaining unchanged. Anthrax was the first transmissible disease to be brought under control as smallpox or hog cholera.

The nature of abortion in cattle has not been clearly defined because the word "abortion" has an arbitrary and uncertain meaning. When added "contagious," the condition to define. Strictly speaking abortion is the cessation of a fetal cadaver. Some have added "barrenness" to the term, but "sterility" is a broader term and includes barrenness. Sterility.

Texas fever was discovered in 1894 by W. H. F. Krehm in the Texas Panhandle.
from the mother an abundant food supply, such food is already digested and is passed through the placental filter which holds back all known bacteria and serves admirably to guard the embryo against the invasion of any harmful substances through the blood. The cervical canal is promptly closed by the uterine seal through which, so far as known, bacteria do not pass. Hermetically sealed within the uterine cavity and delicately guarded by the placenta, the embryo ideally occupies most elaborately protected position to be finally born in a healthy condition.

Instead there are barriers and dangers every step along the way. Even if not most, calves when born carry from the uterine cavity of the mother. Evidently, the digestive tract indicates their affinity for the genital tube or they would not be found there. The pregnant uterus of the mother, and the genital organs of some calves contain bacteria invading the alimentary tract throughout life and disease. Both tracts open into the alimentary tract, continuous with that of the mother.
young animal are rare. The small nodules in the genital mucosa, designated the granular venereal disease, are virtually universal in both sexes of calves but are experimentally avoidable. After the calf has reached three or four months of age, the lesions remain static until copulation occurs, when they promptly multiply by hundreds or thousands and a mucopurulent discharge ensues. This, too, can be experimentally avoided.

In the cervix, uterus, oviducts and ovaries, bacteria are quite commonly recognizable from calfhood to old age, but up to pregnancy gross genital lesions are not common. Frequently, however, sufficient infection exists in the cervical canal, uterus or oviducts to bar pregnancy, making it clear that the genital tract, even at this period, often fails to hold under workable control the resident infection.

Throughout sexual life the supply of food material for bacteria in the genital tract is very inconstant. In the non-pregnant heifer or cow there normally occurs a copious hemorrhage into the uterus every three weeks throughout her sexual life. The menstrual blood supplies abundant nutrition for bacteria.

If the heifer copulates successfully at her first estrum, menstruation generally fails and she is not again in estrum for about ten months. If she again copulates successfully at her first estrum after calving, menstruation is again barred during her second pregnancy. It is proverbial that a heifer calf coming unexpectedly in estrum and copulating, virtually always conceives, while the heifer held out of breeding in order to secure greater size, which menstruates twelve to fifteen times, affording new opportunity each time for increased bacterial vigor, does not so readily conceive and becoming pregnant, her pregnancy is not so safe.

Pregnancy offers a still different opportunity for bacterial activity in the uterus. The embryo with its membranes and liquids has had little time in which to acquire bacterial resistance, and it therefore provides abundant nutrient supply for the bacteria present. The formation of the uterine seal, hermetically sealing the uterine cavity, modifies that supply of oxygen to the bacteria present and affects their vigor. When pregnancy terminates, the genital passages are for a time widely open, offering free access to the uterus from the exterior, the uterus is exhausted, the vulvo-vaginal mucosa abraded, and the placental areas denuded by dehiscence of the placenta. Under such widely varying conditions there is logically great variation in the behavior of infection.
When a calf suffers from dysentery, pneumonia or other degree of disease lowering its resistance, bacteria escape from the weakened gastro-intestinal or pulmonary tract and acquire a habitat elsewhere as is shown in arthritis and pyemic abscesses. I observed abscession of the two epididymes in a bull calf which formed an impassable barrier to breeding. It was virtually certain that the lesions occurred in early calfhood when digestive disturbances had lowered his vitality and the damaged alimentary was unequal to the task of guarding the tissues against invasion.

All spermatozoa perished where formed, and all ova discharged by the ovaries of females with which he copulates, perished because of the absence of the male cells. Thus the infection in the epididymes of the bull caused indirectly the death of all spermatozoa and ova involved. The two germ cells essential to the formation of an embryo had been caused to separately perish. The same infection might logically have destroyed the fertilized ovum had the two met and fused.

With perfect analogy, heifers arrive at sexual maturity with the oviducts closed as a result of infection, so that however perfect the ovum may be it cannot leave the ovary and the spermatozoa cannot ascend to the pavilion of the tube to fertilize it and both egg and spermatozoa perish.

Numerous heifers thus fail to reproduce owing to the results of infection which has preceded copulation and, so far as can be determined, dates back to early calfhood. Infection may exist at various points in the genital tract without rendering the meeting of the ovum and spermatozoon impossible.

We observe a bull of exceedingly low fertility. If his semen is examined immediately after copulation most spermatozoa are dead. The cows and heifers he serves are chiefly sterile and of those which clearly become pregnant, a majority are observed to expel a fetal cadaver. Postmortem search reveals bacteria in the epididymes and seminal vesicles. The bull is not only ejaculating mostly killed spermatozoa but the discharges along with these, living bacteria which carry a peril for the prospective fertilized ovum.

We have reasonable clinical evidence, supported by bacteriologic data to lead one to believe that a bull may harbor so intense an infection in his genital organs as to destroy his spermatozoa and the living bacteria being injected with the semen, implant in the genital tracts of cows and heifers an infection
of such potency that thereafter they do not become recognizably pregnant when bred to bulls known to be fertile.

Clinically we often observe a failure of heifers to conceive when bred to bulls of known fertility and upon palpating the genital organs, no departure from the physiologic state is recognizable except that the corpus luteum has undergone cystic degeneration. Upon autopsy the cyst in the corpus luteum and the oviduct lumen contain identical bacteria and lying dead in the tube are abundant spermatozoa. The spermatozoa in the pavilion of the tube show that the bull was fertile and lead me to believe that the bacteria present killed spermatozoa and ovum and also invaded the crater of the ovisac through the ruptured area and caused the cystic regeneration of the corpus luteum. The cystic degeneration of the yellow body disturbs the estrual cycle and the animal may again come in estrum 7 to 30 days later.

Invisible destruction of the fertilized ovum quite certainly extends over a somewhat prolonged period of time. Finally a recognizable embryo is formed and surrounding it are its envelopes of amnion and allantois. Between the allantois (chorion) and the uterus, bacteria are recognizable by present methods in a majority of all pregnant uteri, just as bacteria are recoverable from a majority of non-pregnant uteri. The bacteria lying between the embryonic membranes and the uterine mucosa promptly attack the embryonic sac. In the central portions the bacteria are largely pushed away mechanically or are brought under control by the highly vascular, active tissues. At the apices of the uterine horns, where the placentae are few and small and the embryonic sac is non-vascular, the bacteria wage a partially successful attack and, so far as can now be determined, are the cause of the necrotic tips of the fetal sac. The non-gravid horn of the sac of the embryo is less vascular than that of the gravid horn and the necrosis of the non-gravid tip is far greater than that observed in the gravid tip. The non-gravid tip is occasionally necrotic over half its area and rarely the entire horn is involved. The necrotic portion is generally surrounded by a dirty yellowish exudate, sometimes by the typical "exudate of contagious abortion." More than 95 per cent of all embryonic sacs in cattle show these necrotic areas clearly.

It is possibly largely through these necrotic areas that infection penetrates the allantois and later the amniotic fluid, and being swallowed by the fetus, is lodged in the gastro-intestinal
tract where it finally causes diarrhea in the fetus in some abor-
tions, and is the basic cause of calf scours or dysentery.

In swine the conditions are different and highly suggestive of
possible unseen embryonic death in cattle. As a rule the ovaries
of sows show 12 to 20 corpora lutea witnessing the number of
ova discharged. The embryonic sac of swine is necrotic at both
effects and it appears that the extent of the necrosis is in pro-
portion to the number of necrotic embryos and in inverse ratio
to the number of corpora lutea. That is, if the necrosis of the
ends of the sacs of live embryos is great, there will be relatively
large numbers of dead embryos. Many of the dead embryos
macerate and are absorbed and the result is a gross excess of
corpora lutea over the number of embryos, dead or alive. In
other words, the average number of pigs farrowed by sows
is not dependent upon the number of fertilizable ova given off
but upon the proportion of ova or embryos which perish be-
cause of infection. On the whole, the average number of pigs
in a litter falls more than 50 per cent below the number of ova
discharged, for which the breeder has to thank infection within
the uterus.

The necrosis of the tips of the fetal sac is not highly perilous
in cattle so far as can be seen. But the early destruction of an
embryo must pass unseen.

The infection within the uterus of the cow is not confined to
the apices of the uterine horns. Its most destructive location,
next to the oviducts, is in the cervical end of the uterus. When
the infection in the cervical canal is so intense as to cause vio-
 lent cervicitis, it tends to prevent conception directly. Indi-
 rectly the cervicitis tends constantly to extend forward and in-
volve the uterus, oviducts and ovaries. If a fertilized ovum
enters the uterus, it is immediately attacked and may be de-
broyed and either expelled or absorbed without clinical recog-
nition. Concurrently, endometritis is established at the cervical
end and slowly extends toward the oviducts by continuity.

If the infection is small in amount or is slow in virulence, the
embryo finally reaches a stage of development where under cer-
tain conditions it is recognizable. But the peril to its life does
not abate. The practitioner in examining the genitalia now and
then encounters and recognizes the remains of a very small em-
bryonic cadaver. Sometimes the embryo has macerated and along
with the fetal membranes is broken up, the pieces being
 clearly recognizable. Or the embryo has reached 0.5 to 1 inch
length and lies in the cervical canal or vagina within its mem-
branes. Sometimes the embryo is absorbed but the fetal sac desiccates to constitute a hard, long, slender thread which the veterinarian not rarely finds protruding from the cervix into the vagina, or in douching the uterus, the string is caught in the fenestrum of the catheter and pulled out with it. In the sow even half grown embryos die, macerate and are absorbed. The same process is attempted with less success by the uterus of the cow.

It is only very rarely that such embryonic cadavers are seen, probably not one out of one hundred cases. Those which are observed are designated abortion, while those which pass unobserved are necessarily called sterility.

As the embryo increases in size, it becomes increasingly probable that the expulsion of its cadaver will be observed. The observation of the expulsion of a fetal cadaver rests ordinarily upon two factors. The cadaver itself is sufficiently large that it is readily seen either naked or surrounded by its membranes, or the naked fetus is expelled and the fetal membranes retained, protruding from the vulva.

The proportion of expelled fetal cadavers which are observed will vary not only with the size of the embryo but also according to environment. After about the fourth month of pregnancy, most fetal cadavers expelled by dairy cows closely confined in well-kept paddocks and stables will be seen, while cows running at large may expel a comparatively large fetus unobserved, and what would be abortion in the closely watched dairy cow becomes sterility in the cow less closely observed.

The infection within the pregnant uterus cannot, as a rule, involve either the uterus or embryo alone but simultaneously imperils both mother and embryo. Since the infection is located in the uterochorionic space between the contiguous chorion and uterine mucosa, each is alike exposed. There may be, and apparently is, a difference in resistance. The infection having been long in contact with the uterine mucosa, in old standing cases that membrane has acquired an important power of resistance, while the embryonic sac enjoys no such protection and therefore apparently suffers more during early pregnancy than the uterus of the mother. This difference in the acquired power of resistance between the fetus and maternal uterus results in highly interesting clinical phenomena.

In early pregnancy, when the embryo has acquired but slight power of resistance toward the infections present, it perishes and is broken up or expelled without being accompanied by any
notable disease of the uterus or other genitalia, but later when the embryo and its membranes have acquired considerable resistance, the uterus may suffer as much or more than the fetus. So in premature birth the fetus admittedly suffers much but before the infection kills it there is established a localized endometritis which brings about the expulsion of a viable calf. Yet more frequently the fetus resists the infection to full term, a more or less vigorous calf is born but the infection has gained such momentum in the uterus that the life of the cow is in peril.

In a large proportion of non-gravid and gravid uteri the bacteria in the uterus cause no visible harm but lie virtually dormant. They cause, so far as known, no agglutinin or other recognizable substances in the blood. At the other extreme they cause total uterine gangrene with death. Between these two poles every grade of disease occurs. A localized, moderate endometritis at the cervical end of the uterus sets up an irritation which tends to cause the ovarian end of the uterus to contract and bring about the expulsion of the uterine content, whether it be a fetal cadaver or a living fetus, immature or mature. In the first case, if observed, it is termed abortion, if alive and immature, it is known as premature birth, if alive at full term, it is designated birth. In each case the same metritis is present but it varies in grade and in the stage of development. Metritis does not always cause or tend to cause expulsion of the uterine contents. While endometritis at the cervical end of the uterus tends to shorten the duration of pregnancy, it concurrently prolongs the duration of parturition. The duration of physiologically ideal parturition in heifers is fifteen to thirty minutes but abortion, premature birth and birth at full term in the presence of metritis is tardy. The tardiness is most marked in the metritis of pregnancy at full term. A cow may then be in labor for twenty-four or more hours though the fetus is alive and normal in volume, presentation and position and the cow has normal vulva, vagina and cervix. The metritis has rendered the uterus paretic and powerless to promptly expel its contents. If the metritis is severe and involves the entire uterus, expulsion of uterine contents fail and maceration of the fetus begins. This either destroys the life of the mother or there is established a permanent pyometra with retention of skeletal debris. The metritis affects variously the destiny of the fetal membranes. The inflammation may involve chiefly the inter-cotyledonal mucosa or the placental structures or attack placental and non-placental areas much alike. During early pregnancy the placental tufts are not elaborate, consequently placentitis usually re-
results in the early separation of the fetal and maternal placentae prior to the expulsion of the fetal cadaver, so that retained placenta does not occur. Later when the chorionic tufts have become more elaborate and the placental crypts correspondingly deep, placentitis tends to cause retention of the fetal envelopes whether abortion, premature birth or birth at full term occurs. Later the placenta may be released by suppuration within the crypts and more or less destruction of the chorionic tufts, or the placental mucosa may slough away. Sometimes the cotyledons become gangrenous and slough through the pedicle, leaving the uterus devoid of normal placentae and rendering essential, if pregnancy recurs, the formation of adventitious placental structures in the inter-cotyledonal mucosa. The gangrene may not stop at the cotyledons but may involve the entire uterine mucosa, destroying utterly the physiologic uterus though leaving the muscular and peritoneal coats intact, or the entire uterus may undergo gangrene and cause the death of the animal.

The course of infection in the embryo is not less variable and interesting. As soon as the gastro-intestinal tract is formed and the pharynx open, the fetus swallows its amniotic fluid constantly. Bacteria in the utero-chorionic space quickly penetrate the chorion, gain the amniotic fluid and are swallowed by the fetus. In the fetal stomach and intestines the infection may be held under control temporarily or permanently or the fetus may break down. In many aborts fetal diarrhea precedes fetal death and expulsion. Other fetuses suffer from diarrhea but resist it successfully and are born at full term. A majority of fetuses hold the bacteria in check and are born in vigorous health but tend to break down later with dysentery or pneumonia.

When fatal dysentery occurs, whether in aborts, premature calves, or in calves born at full term, postmortem examination reveals general sepsis as a result of the destruction of the gastro-intestinal epithelium which offers an open avenue for invasion by any and all bacteria in the digestive tract.

Infection within the non-pregnant uterus acts directly upon that organ only but as soon as pregnancy occurs it must act concurrently upon both uterus and embryo. In the uterus the infection may have existed during the entire life of the animal or may have invaded the organ at any time prior to conception or during the act of copulation, or, according to many, may invade the uterus during pregnancy. The infection persists throughout pregnancy, and may in the later stages, acquire high virulence and destroy the life of the mother. More frequently it
causes her death soon after pregnancy terminates. If the cow survives this period, the infection may permanently destroy her fertility or interfere with reproduction in varying degrees.

As already outlined, the male and female germinal cells may separately perish as the result of the infection, it may destroy the fertilized egg, the morula, the embryo or the fetus and may eventually cross the birth line and destroy the calf as septicemia, dysentery, pneumonia, arthritis or otherwise and may continue in the organs of the surviving calf for an indefinite period, if not for life.

Abortion—the observed expulsion of a fetal cadaver—consists of approximately concurrent crises in the course of the infection in the two individuals, mother and fetus. The fetus perishes and concurrently the infection so irritates the uterus that it contracts and expels the fetal cadaver. If these crises are not concurrent, abortion fails and on the one hand there is retention of the fetal cadaver with maceration, and on the other hand, the expulsion of the living fetus to constitute premature birth. From these immediate disasters the effects of the infection shade off into every possible result.

Abortion acquires its chief interest because of the two concurrent crises in the course of infection acting on mother and fetus. Nocard concluded that abortion consisted of a disease of the fetus. Bang considered it an endometritis of the cow. Schroeder suspects that the infection may involve both cow and fetus. Every veterinary practitioner having experience with cattle knows that the dead fetuses are not all expelled and that all fetuses expelled are not dead. Endometritis of pregnancy does not nearly always cause expulsion of the fetus. It frequently occurs that in a herd of cows where abortions reach 80 to 85 per cent 90 per cent show metritis during and immediately following parturition. Neither are fetal cadavers regularly expelled. They are frequently retained in cows and are generally retained in sows. If fetal cadavers in swine were promptly expelled, it would generally involve the expulsion also of the living fetuses and this would almost ruin the swine industry. Instead they are regularly retained until full term and expelled incidentally with living pigs.

Abortion is not a disease, nor a lesion, nor, properly speaking, a symptom of a disease. No clear conception of abortion is possible without considering separately the death of the fetus and its observed expulsion. The death of the fetus is clearly due to disease of the fetus and its expulsion is just as clearly
due to a disease of the uterus. Disease of the fetus is not always, nor even generally, fatal to it but it may later prove fatal to the calf. The disease of the uterus may cause lesions in the non-pregnant heifer, may exist throughout pregnancy and extend indefinitely into the post-pregnant epoch. At any time it may acquire violence and destroy the life of the animal.

When the belief became established that some, much or all abortions were due to infection, the believers in such infectious or contagious character immediately separated into two ill-defined groups. The one group believed abortion to be a specific contagious or infectious disease, while the other group regarded abortion not as a disease but as one of the results of an infection attacking contemporaneously the fetus and mother. The second group believed, and still believes, that an indefinite number of microorganisms may attack the ovum, embryo or fetus, imperil its life in utero, and failing to destroy life there, may persist in the new-born young and continue its menace to health and life. So it was asserted that tuberculosis, foot-and-mouth disease and other contagions caused abortions. More recently many leading investigators have asserted that abortions occur rarely or frequently from various microorganisms, commonly resident in the non-gravid uterus, which are known to persist during pregnancy, to invade the fetus and to be carried by the fetus into post-natal life. Amongst these common residents of the genital tract which have been regarded as causing abortion, may be mentioned the tubercle bacillus (McFadyean), the colon or paracolon bacillus (Nocard, Meussu), the streptococcus (Sven Wall), B. pyogenes (Zwick), etc. In addition, McFadyean and Stockman and Theobald Smith recognize a spirillum as a fruitful cause of abortion though it has not been determined that the organism is a common dweller of the genital tract.

The question of the specific or non-specific nature of abortion has led to much misunderstanding amongst veterinarians and laymen. I have insisted that abortion is not a specific disease and is not a disease at all but that it is the result of a contagion or infection which may be specific or non-specific. But when I state such belief I am not at all certain that those opposed to me understand my meaning, and it is just as doubtful about my understanding others when they say it is a specific contagious or infectious disease. I regard as a specific contagious or infectious disease one which is caused by a single micro-organism only, like tuberculosis. It is caused by the B. tuberculosis and cannot be caused by any other organism. If the
B. tuberculosis is present and active in the tissues, the individual has tuberculosis. It is specific and definite. Tuberculosis may, and apparently rarely does, cause abortion and it frequently causes sterility in both cows and bulls. But tuberculosis is not abortion or sterility and neither abortion nor sterility is tuberculosis. The abortion or the sterility is the consequence of certain specific tubercular lesions. Tuberculosis produces certain specific lesions so characteristic that in post mortem work probably 99 per cent of all diagnoses in cattle are made by microscopic examination.

I confess I do not know, and so shall not attempt to explain, what my opponents mean when they assert that abortion is a specific disease. I freely admit that such specific diseases as tuberculosis of cattle, dourine of horses, and syphilis of man may cause abortion.

It is alleged that the specific character of abortion has been proved by the experimental production of abortion by inoculating pregnant cows and heifers with the B. abortus. A careful examination of the evidence shows that but few cattle have been used in these experiments and that essentially no controls have been kept. There is on record but one animal used directly as a control and she aborted. The chief recorded experiments designed to prove the power of the B. abortus to cause abortion in an existing pregnancy in cattle were conducted by Bang, McFadyean and Stockman, and in the New York State Veterinary College at Cornell University.

Bang inoculated 7 cows, one of which, or 14 per cent, aborted. He kept no controls and gives data upon the prevalence of abortion in but one herd, the Thurbylille, in which the rate of observed abortions over a number of years was 10.8 per cent.

McFadyean and Stockman inoculated 28 heifers, 7, or 25 per cent, of which were observed to abort. They kept no controls. Stockman records data showing an average of 30 per cent of abortion in uninoculated animals.

A group of 39 pregnant heifers were chased by a dog and 11 of them aborted later. McFadyean examined the blood of some of these and testified in court that they did not abort from contagious abortion. Inferentially there was a common cause and hence a dog, by chasing 39 heifers, caused 28.2 per cent of them to abort, whereas only 25 per cent of animals he had inoculated aborted.

In co-operation with Stockman, Bland used injections of living abortion bacilli to control abortion and pregnant heifers so
inoculated aborted at a rate of 11 per cent while control heifers in the same herds aborted at a rate of 20 per cent, or the uninoculated heifers aborted at a ratio almost twice as great as those inoculated.

At the New York State Veterinary College the chief recorded experiments were two groups, one of five cows, the other of five heifers. The five cows were in an abortion storm the prior year and one of them had calved. After the inoculation, all aborted, leaving the reproduction at zero as against 20 per cent the prior year. None of the five heifers aborted. In the various annual reports of the New York State Veterinary College I have recorded many data of the abortion rate in various herds and in none of these has the ratio of abortion been less than that recorded in cattle experimentally inoculated.

Some experiments may have gone unrecorded but if so the results were probably such that they would detract from, rather than add to, the evidence in favor of the abortifacient power of B. abortus. I do not understand how it can be said that the recorded evidence proves that the B. abortus is competent, when inoculated into pregnant cattle, to cause abortion reliably or regularly in the existing pregnancy. The question of the power of B. abortus to cause abortion is a wholly different matter.

In pedigreed herds there occur about three copulations for each pregnancy, or about 67 per cent of efforts at reproduction fail without evidences of pregnancy becoming established. Approximately 15 per cent of recognized pregnancies terminate in the observed expulsion of a fetal cadaver and more than 50 per cent of the calves born bear with them from fetal life bacteria in the gastro-intestinal tract. In other words, copulations in pedigreed cattle, each of which, if both bull and cow are sound, should result finally in the birth of a calf free from bacteria, actually result in such a birth in about 15 per cent of cases. That is, if the total number of copulations be ascertained and each calf be examined at birth for bacteria in its gastro-intestinal tract, there will be about 15 calves for each 100 copulations in which bacteria cannot be found.

In this great carnival of infection, disease and death, the observed expulsion of the fetal cadaver makes the greatest impression upon the breeder, dairyman, and veterinarian. Actually playing a minor role in the tremendous losses occurring in all species of breeding animals, abortion strikes terror to the breeder and dairyman. The intra-uterine and fetal infection, when causing fetal death and emphysema with gangrene of
the uterus and the death of the mother, is not at all so terrifying. The fundamental character is identical but the death of the cow is a risk which the owner calmly accepts and the death of the fetus without its expulsion is a natural corollary. If 50 per cent of a herd has retained afterbirth it produces no such terror as 10 to 20 per cent of abortions in rapid succession. The breeder sees a fatally infected calf die 2 or 3 hours after birth and looks upon the occurrence as one of the normal risks although abortion has been escaped by a few hours only. So with sterility, a breeder may have 10 to 20 per cent, or even 50 per cent of his cows and heifers sterile owing to infection in the genital tract and while he regrets it and keenly feels the financial loss, there is no terror in it. And yet the sterility is actually death and expulsion of an embryo or fertilized ovum which he has not seen. So nearly as the data I have been able to secure will permit me to estimate, I feel safe in saying that less than 20 per cent of the losses dependent upon the infections in the genital tract of cattle are referable to the observed expulsion of fetal cadavers.

It is frequently stated by many writers that sterility, metritis and retained afterbirth of cows and septicemia, dysentery and pneumonia of newborn calves are complications of, sequelae to, or associated with, abortion. These assertions are deplorably misleading. The entire group, with numerous other less common phenomena are merely the results of the ravages of infection within the genital tract. To separate each of these results or phenomena into distinct diseases is like taking a case of tetanus in a horse and dealing with the locked jaws as one disease, the protrusion of the third eyelid over the eyeball as a second disease, the elevation of his tail as a third complication and death as a sequel.

More than twenty years ago Professor Bang, asserting that abortion in cattle was a specific contagious disease, announced that he had discovered the specific cause.

He was followed almost universally and with extraordinary enthusiasm. Permeating veterinary literature everywhere is the declaration that abortion in cattle is a specific contagious disease and that it has been proven to be due to the B. abortus of Bang. In conjunction with this declaration it was stated by Bang and generally accepted that the specific organism having been recognized, the control of abortion was in sight. But the control so clearly seen in 1896 has behaved like a mirage, and infections of the genital tract are more costly to cattle breeders and to the nation today than 20 years ago.
The bacteriology of the genital tract of cattle has been very poorly and superficially studied, largely owing to a narrow, intolerant conception of abortion. No sooner had people begun to believe that abortion was due to contagion or infection than they began to believe that abortion was a specific disease like tuberculosis. Investigators of abortion since the discovery by Bang have largely limited themselves to the recognition of the B. abortus and a study of its characters. If in their researches they met with other bacteria in the abort or in the uterus of the aborter, these were discarded as of no consequence and their presence not reported. Investigator after investigator reported finding the B. abortus of Bang in pure cultures but nobody knew what they meant. Probably most readers of these reports believed that no other bacterium than B. abortus was present. But such a view was probably wrong in nearly every case. What was apparently meant was that they did or did not discover the Bang organism and ignored all others.

The Department of Research in the Diseases of Breeding Cattle in the New York State Veterinary College at Cornell University has constantly endeavored to search out and study all bacteria recognizable in the cervix, uterus, oviducts and other genital organs. It was quickly found that the species of the organisms in the pregnant uterus, thence invading the fetus, were numerous and so far as could be determined, possessed pathogenic powers.

The objection to our findings were largely based upon our failure to experimentally cause abortion with any of the organisms which we were studying. Most investigators stated that the pathogenicity of the B. abortus had been proven by experimentally causing abortion in essentially all domestic animals and in guinea pigs. In 1912 I asserted before this association that it had not been shown that the injection of living B. abortus cultures into pregnant cattle would or could cause a higher rate of abortion during the existing pregnancies than would follow a similar injection of physiologic salt solution. No new evidence has been recorded since.

Failure to thus experimentally induce abortion is not evidence that the B. abortus does not cause abortion. The important point is that a fundamental element in the nature of abortion hangs upon this question. If abortion in cattle is a specific contagious disease which may and does invade the pregnant animal and cause the existing pregnancy to end in abortion, the chief element in its control rests with the care of the pregnant animal. If on the other hand, as I have contended, abor-
tion is not a specific disease, and is not a disease at all but merely a result of a disease of the uterus of the mother and of a concurrent disease of the fetus, that the infection is chronic and invades the uterus at the time of copulation (infection by the bull) or already exists in the genital tract at the date of copulation, then it becomes essential to adapt measures of control to this conception of its nature.

It is consequently of vital importance to the control of abortion that this fundamental question should be clearly and permanently settled. I believe that no greater service could be rendered to veterinary science and to cattle breeding and dairying than that some authority with sufficient funds at its command should procure a large number of pregnant heifers or cows, divide them into two equal groups, alike in past history and behaving alike to the agglutination test for B. abortus, inoculate one group with living B. abortus bacilli and the other with sterile salt solution and report the results. If it is shown clearly that abortion in cattle can be reliably caused in this manner, then evidently any control measures should be taken with due regard for the facts thus revealed.

It is important, also, that wide publicity be given to the fact that attempts to cause abortion during a given pregnancy by inoculation with B. abortus has failed because the contrary allegation has been used to discredit studies of all other bacteria recognized in the utero-chorionic space and in the alimentary tract of the fetus. No one has seriously tried to produce abortion by experimental inoculation with these. There is no reason to believe that experiments with these would succeed any better or fail any worse than those with B. abortus.

I have constantly held that all abortions occur as the result of infection in the utero-chorionic space and that in all or essentially all instances the bacteria penetrate to the amniotic fluid and are swallowed by the embryo. If, therefore, an abort is examined and a certain bacterium is found in abundance in its alimentary tract and in the uterus of the aborting cow, and no other species of organism can be found in either, the investigator is justified in regarding such organism as the cause of the disaster. Thus, when McFadyean and Stockman, in searching aborts from several herds, could not recognize the B. abortus but did find abundantly a vibrio similar to, and possibly identical with, the vibrio commonly present in abortion in sheep, they were justified in suspecting that the vibrio was the cause of the abortion. Could they have added to the facts of the pres-
ence of the vibrio, and apparent absence of B. abortus, a failure to find any other bacteria or organisms having pathogenic possibilities, they would have been quite warranted in believing the vibrio the cause of abortion in the herds named. So with the findings of Theobald Smith in this country. When he examined a considerable number of aborts, and in some failed to obtain B. abortus but did recognize a vibrio probably identical with that of McFadyean and Stockman, he was quite entitled to believe that as between the B. abortus and the vibrio, the latter was the logical cause of the abortion. But Smith observed the presence of colon and other organisms also in these aborts and gave no extended study to their possible pathogenic relation. So with Moussu who avers that in large areas in France where abortion is very destructive, the B. abortus is absent and the abortion is due to a colon bacillus.

Moussu's statement draws notable support from the accepted views regarding dysentery of calves, in which it is quite commonly believed that the disease is due primarily to the colon bacillus. The researches of Hagen and Carpenter in, or in collaboration with, my department have clearly established the fact that dysentery or calf scours is fundamentally an intra-uterine infection. It is further established beyond doubt that aborts frequently, if not generally, suffer from diarrhea not long prior to death. Calves are occasionally born with dysentery of a very pronounced type. The colon bacillus is apparently the dominant factor in calf dysentery and according to our limited researches is also the dominant infection in pre-natal diarrhea. There are good reasons for believing that embryonic diarrhea is an important factor in embryonic death and hence in abortion. There is no reason known why a bacillus capable of causing dysentery in a calf should not also be able to cause diarrhea in an embryo and vice versa. One of the most misleading views, if such view actually exists, is that birth constitutes a line of demarcation in the field of pathology. Many apparently believe that infections must be clearly divided into ante-natal and post-natal species, that one bacterium can attack an embryo and destroy its life in utero and be expelled in the cadaver but it cannot cross the birth line in a calf. The idea of many seems to be that either an infection in a fetus must destroy it, or the fetus must destroy the infection ere it may be born, and that a pregnant uterus suffers from one kind of infection and a non-pregnant uterus from another kind. When however, the non-gravid uterus, the gravid uterus and the fetal gastro-intestinal tract are examined and compared, it is clear
that an infection resident in the uterine cavity of an aged cow is present also in her young embryo, thus grasping at once the beginning and end of life. More than that, there is no evidence to show that these same infections may not destroy the lives alike of the aged cow and the tiny embryo. At no period between these extremes are the bacteria known to be absent. While it is true that the calf early acquires a degree of resistance to the group of organisms invading its gastro-intestinal tract while yet in the uterus, it is equally true that the bacteria may in some unknown manner acquire a new virulence and break as a storm in a herd. At one time abortion predominates, at another, sterility, and less commonly instead of the fetuses or calves perishing, the puerperal cows and heifers suffer most notably. Thus in one case, not at all unique, I saw in a herd of about 60 cows and heifers, 20 per cent die from metritis within a few days after calving, and another 20 per cent become hopelessly sterile, totaling a direct loss of 40 per cent of the adults. The pregnant animals had been kept in two distinct groups, heifers and cows, without any recognizable direct or indirect contact and both suffered alike.

The leading investigators of the world today, McFadyean and Stockman of England, Wall of Sweden, Moussu of France, Zwick of Austria, Theobald Smith of America and others freely assert that other organisms than the B. abortus are competent to cause abortion. At present there is no known means of differentiating between these causes in a given case except by determining that only one bacterium is present or that one certain organism greatly preponderates. Where there is an abundant variety the actual offender cannot be identified.

No organism believed by anybody to be responsible for any great number of cases of abortion produces any known specific lesion in cows. Theobald Smith found the same lesions in aborts in which the B. abortus and not the vibrio was present as in those cases where the vibrio was present and the B. abortus absent. The essential lesions in fatal dysentery of calves, outside of the respiratory and digestive tracts, are virtually like those of aborts. No pathologist can tell by a histologic examination of the uterus of an aborter or of the internal organs of an abort whether the disaster was caused by B. abortus, vibrios, co'lon bacilli, streptococci, staphylococci, B. pyogenes or micrococci.

At this point there is a strong analogy between abortion and wound infection. The surgeon cannot tell by macro-or miscro-
scopic examination of the lesions what bacterium is causing it. Streptococci, bacilli, staphylococci and other forms produce the same lesions, the same variations in temperature, and the same ultimate results.

The species of the invader or invaders can only be determined by bacteriological examination, and since the infection is frequently mixed, it is often impossible to pick out the basic cause of the disturbances. Nor is it necessary that the surgeon recognize the exact cause of infection in a wound except in connection with some specific variety like rabies or tetanus where by timely action the peril to life may be scientifically averted. In the prevention of wound infection the surgeon does not concentrate his attention upon one organism but when contemplating the making of a wound, frees, if possible, the operative area, his hands, instruments and dressing materials from any and all organisms and endeavors to attain asepsis. After a wound has become infected he again uses disinfectants which act essentially alike upon any organism which may have invaded it. When, however, he has reason to believe that a certain species of bacterium dominates, or that a small group of bacteria prevail he may essay the use of bacterins or other biologic products.

Abortion bears other close analogies to wound infection. The uterine mucosa, like the skin, is in a large measure inhabited by a variety of bacteria which under ordinary conditions cause no visible harm to the tissues or body. But let the skin be broken, or the uterine mucosa be disturbed by menstruation or by the implantation of an ovum, an inviting avenue for invasion of the tissues is provided. More than that, the delicate embryo present might be likened to a blood clot in a wound as affording a highly nutrient field for bacterial growth, with scant power on the part of the embryo to resist. In this inviting field for growth the bacteria accumulate force, multiply rapidly and may, sooner or later, cause disaster.

The various portions of the genital tube may, and apparently do, offer special opportunities for the growth of different organisms. Hagan and Carpenter have found in the oviducts chiefly streptococci, while in the uterus colon organisms are common. So far as can be seen it is quite possible, therefore, that the destruction of a spermatozoa and ova in the oviducts is largely the work of streptococci, while bacilli possibly play a more important part in the uterus. It is possible, if not probable, that certain bacteria dominate the field at one time, and certain other forms at another epoch. Bang believed in his
earlier writings that pregnancy was essential to the growth of, the B. abortus in the uterus. Later investigations apparently support that belief in a slightly different form, but such appears to be true in a measure of most or all bacteria habitually resident in the uterus. Our investigations and those of others reveal the B. abortus only rarely in the non-pregnant uterus. There is ground for believing also that the B. abortus is not common in early pregnancy but is mostly observed after mid term. Three explanations suggest themselves: (1) The B. abortus in the genital tract, as in the laboratory, is a timid grower and requires delicately adjusted environment for development. It may be, therefore, that the bacterium exists in the genital tract during non-pregnancy and early pregnancy only sparingly and even if caught in the platinum loop, may want the vigor essential to development in laboratory media. (2) There is what seems to me the less probable hypothesis of Schroeder that the bacterium migrates to the pregnant uterus from the mammary gland or elsewhere. (3) The B. abortus may possess the essential characters of a secondary invader and require for its vigorous development a field prepared by other bacteria.

I accordingly hold that abortion in cattle is always one of the results of infection or contagion in the genital tract, that the contagion is non-specific, that it may be due to any one of an unknown number of pathogenic organisms, or of several of them acting jointly, that these organisms are essentially ubiquitous, and that their power to do harm is dependent upon their concentration and virulence at a given time. Lying for the most part dormant in the genital organs while at rest, their virulence is aggravated by the sexual functions, copulation, pregnancy and parturition. The bacteria occur in the genital organs of all ages and both sexes. The infections are acquired by the fetus early in pregnancy and may persist through life to old age being transmitted in an endless chain from generation to generation.

With such a conception it is logical to seek to control the infection, and incidentally the abortion, by devising a comprehensive and efficient plan of sex hygiene, designed to lower the virulence of the infection and curb its transmission from animal to animal. We would seek to break the infection chain by searching for its most vulnerable links. These we have long held are at the time of copulation, when it is essential that so nearly as possible, only animals with clean genital organs shall be mated; and at the time of parturition (or abortion) when
the genital organs of the cow are to be carefully guarded and their return to the physiologic nonpregnant state assured as accurately as possible, with rigid care of the new-born calf to guard it against any breakdown from intra-uterine infection present.

This general plan of handling the great problem is meeting with encouraging success and with accumulating experience and by research, the progress of control is gathering momentum year by year. Many prominent veterinary practitioners in the United States and Canada are engaged in the battle against this scourge who are following this plan in general outline. If a uterus contains pus the practitioner does not inquire whether it is caused by B. abortus, B. pyogenes, colon bacilli, streptococci or vibrios, but proceeds to handle pus in the uterus as he would pus in a wound. One member of your committee (Potter) in a contribution to the American Veterinary Medical Association a few days ago made the significant statement that in his region most of the abortions were due to "pure abortion disease." He did not define what he meant but did state that pure abortion disease burned itself out within two years and the aborting cows, their associates and their offspring were rendered immune. Such being the case, quarantine is evidently superfluous in pure abortion disease by which I assume he means the infection due to the B. abortus. Apparently he desires to quarantine herds because of what he terms complications, like the unobserved expulsion of fetal cadavers, the retained placenta, metritis, and sick calves born before they had time to die in the uterus. I criticised the committee last year because it failed to define abortion. Surely Potter in the communication cited fails decisively to define what he means.

A large proportion of the most valuable herds of pedigreed cattle in the United States and Canada are being handled upon this plan. In some of the herds the work has been in progress for several years. Many of the owners of these herds are men of exceptional business ability and are fully able to measure the results of the work and their continuation of it year in and year out speaks for the plan.

Arrayed against this plan, and against leading breeders and veterinary practitioners who are making valuable progress, is a group of veterinarians, who hold radically different views and seek to have laws enacted which would serve as a writ of injunction against the breeders and their veterinarians mentioned. The committee on abortion presented a report last year in which
this association was asked to go on record by resolution favoring
the declaration of abortion in cattle as a specific contagious dis-
ease, demanding quarantine and other police restrictions. Your
committee declared that it is a specific disease, and scientifically
diagnosable, though by what means it failed to state. But your
committee suggested no outline for such laws and gave no hint
of the character of the laws desired. In effect, the committee
asked this convention to sign a blank check. The committee
did not intimate how many and what class of herds would be
affected by police restrictions. How large a percentage of pedi-
greed herds in the United States and Canada are free from
abortion it failed to state. Personally I know of not even one
herd of 25 highly pedigreed cows of breeding age free from
definite losses due to infections in the genital tract. Your
committee mentioned no such herd. If such a herd exists in
the United States or Canada, no record of it, so far as I am
aware, has been made in veterinary or livestock literature.
Restrictive laws would bear most heavily upon the highest pedi-
greed cattle of priceless value to the upbuilding of our common
herds. Police measures would first of all affect the breeder
of honor who recognizes keenly his duty to the state. Restric-
tive quarantine for "contagious abortion" would be more devas-
tating than the poll-ax. A quarantined herd would never re-
cover from the blow.

But there would be plenty of breeders who would amplify
the definition I have already given of abortion—that is, abor-
tion is the observed expulsion of a fetal cadaver. Throttle ob-
ervation and presto! abortion ceases.

We are just beginning to emerge from a long series of ex-
asperating, ill-considered, harmful laws and regulations for
the control of bovine tuberculosis, especially in pedigreed cat-
tle. Instead of hindrance, the state and nation are now ex-
tending a helpful, friendly hand. Now some are proposing to
revive the tuberculosis follies of twenty years ago and settle
them upon abortion.

I hold that we should apply intelligently the lessons learned
in the campaign against tuberculosis. We should encourage and
greatly improve the work already being done. Veterinary prac-
titioners should become better educated in carrying on the cam-
paign against the diseases interfering with reproduction. Abor-
tion should be assigned to its true place, an incident, and not
at all the most important result, of the ravages of infection in
the genital organs of cattle. We should get away from the
terror of abortion and face with courage and determination the actual ravages being made by genital infections.

In the forthcoming annual report of the New York State Veterinary College at Cornell University, I have outlined some incomplete studies upon a plan for measuring the reproductive efficiency of cattle. This problem has been given considerable thought. Instead of paying exclusive attention to the incident of abortion, the emphasis is laid upon the rate of production of healthy calves. The plan is to devise a scheme by which a breeding inventory can be made of a herd of cattle as complete and accurate as the merchant or manufacturer can make of his sales and of his stock on hand. The breeder with proper study and with the aid of a skilled veterinarian can and should keep his records in such a manner that they may be audited with the same accuracy as the books of a bank. We know, for example, that an ideally healthy cow should, for the highest breeding efficiency, produce a healthy calf each twelve months of her life. We also know that this ideal is not reached nor do our great herds make a near approach thereto. Let us turn from the fetal cadavers dropped in gutter or paddock and concentrate our attention upon the production of healthy calves. If a breeder of pedigreed cattle can have his cows average one healthy calf each 16 months, he has an unusually healthy herd and there are few abortions.

I would urge that breeders be encouraged to vigorously attack the whole problem of interferences with reproduction, giving equal attention to all results of diseases of the genital organs of both sexes and to guard with zealous care the health of the new-born calf and from the moment of its birth to study and protect its health to the end of its life. The general average of reproduction in pedigreed dairy cattle is now apparently between 3 and 4 calves per cow or heifer. This we should strive to double, and the knowledge is already at hand to encourage one in the task. The progressive, courageous breeder has before him a promising opportunity to so improve the reproductive rate of his cattle that he can abundantly afford to open wide the record books of his herd and show prospective purchasers of breeding stock that the sexual health of his cattle is satisfactory.

The group of workers to which the writer belongs, and which is making highly encouraging progress, desires only to be permitted to pursue its task without galling interferences from ill-advised sanitary police laws. The work is not interfering
with the control of any harm due to the B. abortus. That organism is handled, when interfering, with the same vigor as any other bacterium. Under the plan named, pregnant cows are amply guarded against serious exposure from aborters. The segregation plan, with disinfection of the genitalia, surpasses by far the quarantine scheme advocated by our opponents. It puts no meddlesome police restrictions upon the activities of the conscientious, honest, forward-looking breeder and it offers no consolation to the reckless cattle gambler.

I hope this association will set its face sternly and permanently against regulative police laws which would inevitably bring great loss to the cattle industry of the nation, and that it will instead leave the control of the diseases of the genital organs of cattle fundamentally in the hands of the breeder and the veterinary practitioner and trust the great task to their skill, their honor, their sense of their own interests and their regard for the interests of the state.

PRESIDENT DUNPHY: The next paper on the program is, "Sequelae of Abortion Bacilli Infection of the Bovine Uterus," by Dr. E. T. Hallman of Michigan, Professor of Animal Pathology.

SEQUELAE OF ABORTION BACILLI INFECTION OF THE BOVINE UTERUS

By E. T. Hallman, Michigan Agricultural College

The object of this paper is not to discuss the various sequelae of abortion bacillus infection. There are two reasons for not doing so. First, the writer is not sufficiently familiar with many of the morbid conditions following abortion bacillus infection in the uterus to warrant a discussion of them and, second, sufficient time is not available if the first obstacle could be eliminated. What is attempted is a discussion of the writer's investigations of catarrhal endometritis and cervicitis subsequent to abortion.

The data upon which this discussion is based were collected from clinical, histopathological and bacteriological examinations of eight or ten cases of catarrhal cervicitis and endometritis. All of the cases studied were from herds in which Bang's disease was present, and each case had a previous history of one or more abortions. The nature of the abortion disease in each herd had been determined by previous blood-tests but blood examinations were not made of the cases at the time of slaughter. Most of the animals studied have been treated by the writer for
failure to conceive and were slaughtered because the owners did not wish to spend further time and money in an effort to get them with calf. One of the significant results of our work is that in not a single case has Bang’s bacillus been found. To Drs. Staffsen of the Bacteriological Department, Michigan Agricultural College, and Dr. Bandeen, a recent graduate student at Michigan Agricultural College, is due the credit for the bacteriological examinations of these cases.

It must be said that their technique was very careful and thorough. Not only were cultural and animal inoculations made from the superficial secretions but both animal and cultural inoculations were made from the deeper portions of the mucosa after cauterizing the surface with a hot iron. While the abortion bacillus was not found in these cases, cultures of Streptococcus pyogenes, Staphylococcus pyogenes aureus and Bacillus communior, either alone or associated, were found not only in the secretions but in the deeper portions of the uterine mucosa.

The microscopic lesions observed were mucoid degeneration of the epithelium and more deeply seated lesions in the uterine mucosa. Extensive changes in the uterine mucosa indicating large numbers of highly virulent microorganisms were not found. The lesions observed consisted of numerous foci of fibrosis and occasionally atrophy of groups of uterine glands. In places these foci of fibrosis were seen adjacent to or surrounding the uterine glands, at others adjacent to the smaller uterine blood-vessels, and at others independent of the glands and blood-vessels. All grades of fibrosis were seen, varying from small foci of granulation tissue to foci of scar tissue. In a few cases fibrosis of the mucosa was more diffuse with considerable edema and thickening of the mucous membrane.

The glandular lesions also varied from the earlier stages in which were seen many leucocytes in the gland luminae with disintegrations of the glandular epithelium, and the periglandular tissue consisting of granulation tissue, to the later stages with atrophy of the glandular epithelium and periglandular, scar tissue.

I do not want to leave the impression that the changes in the uterine mucosa are very extensive. A clear understanding of this is very important in that it indicates what may be expected from treatment. While there was some fibrosis of the uterine mucosa and atrophy of some of the uterine glands in the cases studied, the changes were such that they could not be detected clinically excepting of course mucoid degeneration of the epithe-
lium which would be characterized clinically by altered secre-
tions.

**Definite Conclusions Not Reached**

These investigations have not been sufficiently extensive to warrant any definite conclusions but indicate some very interesting things. First: they tend to corroborate the conclusions of Schroeder and Cotton and others which indicate that the abortion bacillus does not persist in the non-pregnant uterus. Second: they throw some light on the cause of sterility which is one of the very troublesome phases of abortion disease. It is not probable that all the lesions observed are the result of abortion bacillus infection at some previous pregnancy. Many of the lesions were interpreted as active, notably, mucoid degeneration of the superficial and glandular epithelium and the earlier stages of fibrosis. It is highly probable that the more active lesions were due to the microorganisms demonstrated culturally. viz., B. coli communior, Streptococcus pyogenes, Staphylococcus pyogenes aureous.

It is not the writer's opinion that the results of these investigations detract from the importance of the abortion bacillus as a factor in abortion disease. Until more convincing data are accumulated to the contrary, the role that this organism plays in abortion disease would appear to be the important one.

Organisms indistinguishable from those found in these cases are very widespread in nature, being almost always found in animals, and under normal conditions are apparently harmless. In order that they may establish themselves and cause morbid changes it is apparently necessary that some primary factor lower the resistance of the tissues in which they later establish themselves. The exact role that the abortion bacillus plays in this process is not definitely known. Too little is known of the pathology of pure abortion bacillus infection in the bovine uterus to warrant any definite conclusions. It is highly probable that the changes, due to abortion bacilli, lower the resistance of the uterine tissues and enable what are ordinarily harmless organisms to establish themselves and cause disease. Further, it is entirely consistent with the teachings of bacteriology that certain strains of normally harmless organisms are able at times to establish themselves as pathogens, through some predisposing factor. As a result they are increased in virulence and thereby acquire greater pathogenicity.

That there are good reasons for assuming that the above process may occur cannot be denied. It is only necessary to assume
that the resistance of the uterine mucosa is lowered by the abortion bacillus. Then the secondary invader may be carried from some of the patients on storehouses such as the intestines, the respiratory passages, etc. This assumes that there are bacteria in the blood, and this is conceded by our most prominent pathologists.

To quote Adami and McCrae, "It is true that blood cultures of the healthy yield no growth; nevertheless, there are indications that from time to time bacteria are being picked up from the upper air passages and from the intestines and that under ordinary conditions these are rapidly destroyed by the agency of the blood and endothelium; but if living bacteria be carried to a part where the resistance is low, then in place of undergoing destruction they are able to make a foothold and multiply. It is true that the bacteria which escape into the blood are quickly destroyed by several agencies and the internal organs are potentially, if not actually, sterile.

"Chance" Organisms Cause Latent Infection

"It is these 'chance' organisms which cause the latent infection and the terminal infections, which last so often supervene upon some chronic disease, and which arise not by infection due to highly pathogenic microbes brought in from without, but from bacteria, often of low virulence, which hitherto have been impotent to obtain a foothold within the tissues. In such a case the resistance is at a low ebb, and a small number of bacteria of low virulence doubtless suffices."

As indicated above, these "chance" organisms which are enabled to establish themselves as a result of a process initiated by some specific organisms acquire greater pathogenicity and assume an importance which would not otherwise have occurred. By this process it is not illogical to assume that such microorganisms may acquire such pathogenicity that they may initiate a morbid condition in healthy pregnant and in parturient animals as well as aggravate a condition already instituted by Bang's bacillus.

Recent researches have demonstrated that many different organisms may at times be found on the mucosa of the reproductive organs. Their significance is yet to be determined. The mere presence of bacteria on mucous membranes and in body cavities does not necessarily mean that they are harmful. Infection, pathologically, not only means the growth of bacteria in a tissue with the diffusion of their products but includes the
reaction of the tissue against such products. This latter condition is one which has been too frequently overlooked in our researches. There is a great need for carefully conducted and extensive researches on the pathology of the reproductive organs before the significance of the presence of microorganisms in them can be determined. It is feared that the finding of miscellaneous organisms in the reproductive organs, as reported in recent publications, is causing some to arrive at the conclusion that the abortion bacillus is not as important a factor in abortion disease as has been conceded. There are yet no convincing data that the Bang bacillus does not play the important role in abortion disease. Until more convincing data are accumulated belittling the importance of Bang's bacillus as the primary etiologic factor of abortion disease, our interpretation of the results of recent work on the etiology of abortion is that the microorganisms isolated from aborting and sterile animals are to be considered in the majority of cases secondary invaders and the morbid conditions caused by them as sequelae of abortion bacillus infection. It is not denied that other pathogenic organisms may occasionally initiate conditions similar to those due to Bang's bacillus but it is believed that such cases do not frequently occur.

**President Dunphy**: The next paper on the program is, "Practical Methods of Handling Herds Affected with 'Abortion' Disease," by Dr. John F. Devine, of New York.

**ABORTION DISEASE AND ITS CONTROL**

By J. F. Devine, Goshen, N. Y.

At the Fifty-fourth annual meeting of the A. V. M. A. held in Detroit in 1916, I read a short paper on the value of sanitation in controlling breeding problems. Since then I have had many inquiries, both verbal and by mail, as to the detail in carrying out such methods, consequently I have been prompted to prepare this paper to make it a matter of record in our report, so that those who may be interested in this method as a whole may have it to refer to if they wish.

Realizing the enormous toll this malady exacts from animal husbandry, and conscious of the fact that our knowledge on the whole subject is too wanting to even afford an appropriate name, nevertheless I hold the same opinion that I have held for several years, and that is that the capable practitioner can render valuable service to our stockowners, even with our lack of knowledge while our faithful investigators are unraveling the
mysteries of this scourge, a thing they will surely do if all interested will do their share in giving every assistance they can, either in furnishing material for examination or in faithfully making known their experiences.

This article will be confined to discussing the mitigation or control of so-called abortion disease, since I have an uncertain feeling as to its etiology and know but little about its pathology, and further I feel that if I knew all that others know about these things, I would still be lacking in positive knowledge of some of its phases. I am quite willing to admit that any method of control that I or anyone else may advocate at the present time must smack more or less of empiricism, since it must be based on clinical results rather than scientific facts; still as in treating a case of milk fever, I as a practitioner would rather get results and not know why I get them, than to know why and not get results.

If we stop here to review the present situation a little, we will find there is no agreement as to the cause of abortion, its method of transmission or the cause of re-aborptions. It seems quite generally agreed that the gravid uterus or the fetal tissue, or both, form an ideal media for the growth and activity of the organisms that cause abortion, but what organisms are essential and how do they reach the uterus?

Some are of the opinion that the Bang organism is the causal agent, and while the gravid uterus is where it operates disastrously it lurks all too frequently in the udder waiting to attack the uterus as soon as conditions become favorable. Others believe abortion is due to a mixed infection through the vagina, and that after a healthy uterus is sealed the danger of further infection is past. Still others are quite positive that the cow is infected primarily at least by the digestive tract, and therefore infection in this manner may occur at any time.

Any opinion I may have in the matter must be based largely on reasoning from clinical experience.

If the pregnant cow is infected or re-infected from the udder, then I would be willing to concur in the opinion that the Bang organism is the sole cause of abortion, but my experience makes me doubtful at the present time, since I have data of 37 herds numbering 1,110 animals in which abortion first ran in some herds as high as 47 per cent, and by sanitation and the proper cleansing of the uterus after abortion and subsequent attention to the vagina in herds where this method was followed faith-
fully, we have kept down re-abortion as low as no per cent in some herds and in no herd did re-abortion exceed seven and a fraction per cent. In one herd where 47 per cent of the herd aborted in 1917, in 1918 there was 100 per cent conception, the carrying of calves to full term, and the physiological expulsion of the membranes after dropping normal living calves; while in several herds in the immediate neighborhood re-abortion would run from 11 to 33 per cent. Unfortunately, I have no proof that the udders in all these cases were not free from the Bang organism, but it would seem ridiculous to suppose that they were, when udder infection seems so constant in infected herds, therefore, if second abortions are due to re-infection of the uterus from the udder, how can we explain the lack of repeated abortions in so many herds coming under my observation, where sanitation and the proper cleansing of the generative organs were carried out.

Similarly would sanitation and attention to the uterus prevent re-abortion if the most common method of infection is by the digestive tract? Sanitation might mitigate it and lessen the exposure, but it does not seem feasible that it could eliminate it entirely under ordinary conditions. My own conclusions drawn from my experiences are that either pathological changes in the generative organs occurring from an abortion not only influence or prevent subsequent conception, but also have to do with subsequent abortion or the pathological changes have to do only with the problem of sterility, and that the common source of infection is through the vaginal canal by organisms either independent or associated with the Bang organism, and that infecting or re-infecting of the uterus is preventable by sanitation and vaginal douching, both before, and for a time after conception.

There is still another hypothesis. Two of our ablest workers, Schroeder and Cotton, seem quite confident that re-infection of the uterus with the resultant endometritis, takes place from the infected udder after conception, and whether a cow shall abort a second time depends upon certain things; one being whether or not she has acquired sufficient immunity from the first abortion to resist the second, or again possibly the damage sustained in the uterus by the first abortion would influence the likelihood of a second abortion. If the latter theory be true, it would be entirely reconcilable with what I advocate in the proper cleansing of an infected uterus immediately after parturition.

Notwithstanding that we are still so much in doubt about these matters, it is my belief that this malady and its resultant
disturbances of the generative organs can be reduced to a minimum by:

1. Sanitation.
2. Isolation.
3. The proper cleansing of the uterus when gestation ends, let it be what period it may, and further vigilant attention to the vagina. Next to preventing infection this is the most vulnerable and important point in the whole cycle to attack the virus and mitigate the severity and extension of the infection in the genital tract.
4. The proper treatment of the pathological changes occurring in the genital organs which inhibit conception.

The infecting of a healthy uterus, abortion, spreading of virus, retention of membranes, pathological changes in the uterus, cervix, tubes and ovaries, and subsequent sterility, constitute a cycle that must be attacked either at the port or ports of infection (let it be udder, vaginal or per os) or the genital tract immediately after an animal has aborted, to correct so far as possible the pathological changes rather than allow their extension.

Sanitation

This is to be applied in its fullest sense where infection is known to be present. The entire stables are to be kept scrupulously clean, applying daily a reliable disinfectant or burnt lime to all exposed floor space that is soiled by bowel or vaginal discharges, after all litter and sticky discharges have been removed from the posterior parts of the platform of the standing stalls. The entire platform of standing stalls, and the floors of box stalls should be kept clean enough to meet good sanitary dairv methods and permit proper disinfection.

Should conditions or weather prevent daily scrubbing of these places, they should be kept well lined and heavily bedded, and thoroughly cleaned at least once every four or five days. Paddocks or yards should be cleaned, scraped and limed daily and the yards regraded with soil or gravel as often as required.

Isolation

Some question the value of isolation. I believe isolation of prime importance in the control of this disease when applied intelligently and diligently. My experience in practice has been quite in keeping with the statement of Schroeder and Cotton, in their paper read at the Detroit meeting in 1916. I regard the
pregnant cow or one that has recently aborted as a carrier and a dangerous animal; consequently all pregnant cows during the season they are housed should be housed if possible in separate box stalls where they cannot contaminate one another or infect animals just bred or about to be bred. Similarly the exercising yard should be divided into paddocks where again the pregnant ones can be kept by themselves or still better in separate paddocks for each one as much as possible, and positive isolation of any of them showing a suspicious vaginal discharge; such an animal to be kept completely and permanently isolated until such a time as she has calved and may be considered safe. Obviously the pasture fields are less dangerous than the stable or yards, but even here there is an element of danger, and the separation of the pregnant cows should be as complete as practicable.

Where it is impractical to keep the pregnant and non-pregnant animals separate in an infected herd, great care should be exercised in keeping a close watch on the pregnant ones, and any suspicion of abortion should mean the prompt isolation of such an animal.

While it is true that occasionally the uterine seal may become penetrated and an animal discharge virus for a time without being noticed, still such cases are the exception, and surely the removal of such an animal as soon as she is noticed, is better sanitation than to allow her to remain in the herd as a living manufacturer and spreader of virus for days or weeks after aborting. Heifer calves should be held in strictest isolation from mature animals from birth until after the first parturition, as should all new females brought into the herd.

**Proper Cleansing of Uterus When Gestation Ends**

The technic of properly cleansing an infected uterus will vary but slightly in accordance with the severity of the infection and the period of gestation at which the animal aborts.

It is common knowledge which is rather inexplicable that when an animal aborts in early pregnancy there is usually less inflammatory change and metritis, than when one aborts later. This at first sight appears paradoxical, as it would seem to indicate that the infection might be greater or the resistance of the mother less to cause such early shock, death and expulsion of the fetus. Possibly the explanation is that the fetus offers less resistance at the period. However, the fact remains that when the fetus is expelled at two, three, or four months there
is evidently but a slight cotyledonitis and placentitis, since ordinarily the membranes are easily and promptly expelled. When abortion occurs later in pregnancy, in addition to cleansing the uterus, we usually also have the problem of handling a retained placenta, and we not infrequently have just as severe metritis, cotyledonitis and placentitis where a strong rugged middle aged cow carries her calf full term in spite of the infection, but still retains her membranes. Since there are various degrees of infection; the principal variations in treatment will be as to the duration of the period when a skilled veterinarian must give daily attention, and consequently we will discuss the treatment of endo-metritis, cotyledonitis and placentitis under the heading of "Retained Placenta."

Retained Placenta

When a placenta is retained it is an indication that there must be more or less unnatural adhesions between the fetal membranes and the internal surface of the uterus. It has been the custom for years for both empirics and trained veterinarians when called to attend these cases, to remove all or part of the membranes by manipulations, commonly spoken of as "unbuttoning." The rugged grade cow with a hardy constitution, even under the roughest of handling usually withstood this ordeal, often never missing a feed or decreasing very much in her milk flow. Even some pure-breds withstood this crude handling pretty well until the organic changes caused by the seemingly increased virulence of microbic invasion became so severe as to apparently heighten the susceptibility to infection and absorption in our pure-breds.

First, let me say that we should never use force to remove a placenta from the uterus of a pure-bred or delicate high grade cow. It is true that occasionally we are called to see an animal with a retained placenta where adhesions are very slight, with only a pinching of the membranes at the extreme end of the cornua or slight adhesions of a few of the cotyledons, which is soon released by very little manipulation, and the animal is thereby relieved practically as normally as though the membranes had been discharged without aid; but where the adhesions are more extensive, it is my judgment after twenty years' experience that the man who persists in the old method of "taking them away" will come to grief sooner or later. It matters not how skilled a man may be, puerperal septicemia with all its dangers is sure to overtake some of his patients. The method of removing a placenta and cleansing a uterus that I prefer, is "douch-
ing of the membranes with a warm physiological salt solution, except where a putrid condition exists (in the latter case I may use a mild antiseptic for one or two douchings, rinsing the uterus with the salt solution after), until every shred has been washed away. Some membranes should be allowed to hang through the os, or it should be plugged with sterile gauze, as this will retard its contraction, and it is well to loosen all membranes if possible before the os contracts so much as to prevent the introduction of the hand. It seems almost superfluous to add that the membranes should not be allowed to hang out of the vagina, thereby keeping the tail and hind parts soiled and also answering as a bridge inviting organisms into the uterus, but cut off so that they simply hang through the os; and common decency demands that the tail, hind quarters, and udder be kept clean so as to avoid contamination of the milk and the internal structure of the udder. We will find that after two or three days of douching the capillaries of the cotyledons and the endometrium contract and assume more firmness, thereby lessening the danger of re-absorption, and the adhesions between the membranes and the cotyledons gradually give way, so that by gentle manipulation they can usually be removed completely with safety in from three to seven days. By this method we will find that at no time will we have the foul smelling sanguino-purulent uterine content that we do have when the membranes are neglected, neither will we have the soft friable decomposing uterus that is so dangerous to touch and that so often leads on to metro-peritonitis and death.

With rare exceptions there is no true growing together of the maternal membranes and fetal cotyledons; it is simply a resultant swelling from the inflammatory condition that dovetails them, so to speak, so tightly that the tufts of the chorion are held firmly to the maternal cotyledons. This being so, with our present knowledge of surgery and asepsis, would not hot douching to sooth, cleanse and loosen these membranes be a reasonable thing to do?

I appreciate that in douching a uterus where the membranes are still adherent that we are not douching the utero-chorionic space over its entire surface, but our hot solution is coming in contact with the inner surface of the membranes and also the inner surface of the uterus where there has been the greatest amount of infection and where there is the greatest amount of endometritis; namely, that portion near the cervix where necrosis has so often completed the separation of the chorion from
the cotyledons, and as all experienced workers know we are actually cleansing the parts that need it most, since it is quite the custom of all practical men in beginning to douche a uterus, to roll up the loosened shreds into a rope to avoid their interference with the douching and syphoning out, and in this way the hot solution flows behind the loosened membranes and comes in contact with the inflamed endometrium. There are certain things to be taken into account if the douching of a uterus is to accomplish the desired results; and again there are certain uteri that should not be douché, and every veterinarian should know this before he attempts this character of work.

First, there is no excuse for douching a uterus immediately after parturition, unless it has become in some way seriously infected by manipulation or a decaying fetus. Time should be given for the uterus to do its share as far as it can, by its germicidal secretions.

Second, a ruptured uterus obviously should not be douché. There is usually no excuse for this careless act; nevertheless it is sometimes done. We should first carefully cleanse the external genitals and make a cautious examination of the uterus before beginning treatment or the handling of it. This is not only true in douching, but also in cases of dystocia.

Let me remind you that there are more uteri ruptured where parturition is obstructed, by the labor efforts of the cow, where by force of the diaphragm and abdominal muscles the fetus is jammed into the bony cavity and the membranes ruptured, allowing the fluid to escape, thus exposing the extremities of the fetus directly against the internal surface of the uterus at a time when it is greatly distended and in the throes of labor, than are ruptured by capable veterinarians in handling dystocia.

Even with the fetus in the uterus, ruptures can usually be located if a proper careful examination is made, since at least 90 per cent of all ruptures are either in the fundus or in the superior part of the gravid horn. This is quite obvious when we consider, as we have said, that these are the parts that come in contact with the bony cavity and are forced upward and backward by the softer organs.

Naturally there is nothing to interfere with a careful examination after the fetus has been delivered and we are treating the membranes only, and this examination should be made before we douche the animal and not after. True, the greater the distention, naturally the thinner are the walls, but any one with obstetrical experience knows that the uterus is rather a strong
organ and will stand considerable handling in removing the fetus, or in replacing an everted uterus, it is naturally stronger twenty-four hours after when the walls have contracted and thickened somewhat, and for an intelligent operator to rupture such a uterus which has withstood the natural labor forces, with his hands, a soft rubber hose and water, seems beyond reason.

Third, there is still another condition under which we are not justified in douching the uterus, and that is when we are called to see an animal that has freshened several days before, where the membranes have been held and the uterus either has received no attention and the membranes have undergone decomposition, or where the membranes have been forcibly removed, thereby leaving a raw surface allowing absorption of the putrid uterine content; in either case we are apt to have a resultant metritis or metropneumonitis, accompanied by decomposed uterine walls that have no more strength than paper.

If we examine such a uterus we will find the walls almost as putrid as the content. They are lifeless, slimy or friable and decomposing, in such a condition that the weight of one's finger almost penetrates. I would like to ask what percentage of such cases live with or without douching.

The first day or two but little can be done through the rectum to aid the douching or syphoning, as a matter of fact this is fortunate as the less the cow is irritated the better she is off. It would be well if we could forget, so to speak, the retained placenta, and let it take care of itself; for a day or two, the one thought should be to cleanse the uterus of all exudate and debris thoroughly, but as gently as possible. Supervise the feeding of the cow, see that she has laxative food and succulence if possible. If she is not vigorous in every way, stimulate her all she will stand with such drugs as alcohol, nux vomica, and capsicum.

As the inflammation of the uterus begins to subside, the uterus will begin to involute so that after a few days the cornuili can be grasped with the hand through the bowel, and as the irrigating solution is pumped in with force it may be gently massaged to all parts of the uterus and squeezed out again which seems to materially tone rather than harm the uterus.

This method of irrigation of the uterus proper may be continued as long as the os is sufficiently dilated to admit the hose or catheter.

There is just one danger in douching a uterus of this character that to caution one with veterinary training to guard against seems little short of ludicrous, and that is if the cervix
is so contracted that the tube fills its entire lumen leaving no space for the return of the fluid from the uterus as it is pumped in, and one does not stop pumping when it is filled and press out the fluid, but rather keeps on pumping, it is entirely within reason that one might accomplish what they are apparently bent on, that is, rupturing rather than cleansing the uterus.

Another thing that cannot be repeated too often or emphasized too strongly, is that a uterus should be douched only while it still has life and tone. Douching then will not only cleanse but also stimulate it to early recovery, and when infection is severe this cleansing should not be delayed any longer than thirty-six hours after calving. Twenty-four hours is better.

After an uterus has lost tone and has begun to degenerate it is best to leave it alone, and devote all the attention to improving the physical resistance of the animal.

Thorough cleansing of a recently gravid uterus cannot be accomplished with a few quarts of lukewarm water. The water should be as hot as one can work in comfortably with the bare hands, and may require ten or fifteen gallons to be carried by a hose in the hand as far as one can reach, and never under any circumstance is the hose to be released from the cover of the hand.

This douching can be done daily or twice daily, until the uterus is absolutely clean so far as is perceptible by the appearance of the fluid returned, without in the least disturbing or irritating the most delicate cow, providing due care is taken.

We occasionally find an animal with such an acute cervicitis that when the cervix is touched she gives evidence of severe pain, followed by violent straining. After douching such animals it has been my custom for years, to dry the cervix with cotton, swab it with tincture of iodin and inject into the uterus and vagina a quart of warm olive oil to which has been added two ounces of tincture of opium. This is to be repeated after each douching as often as necessary. There may be better ways of handling these cases, but this method has served me well.

A rather crude but practical barometer as to when we may discontinue douching the uterus proper, is when it is cleansed of all debris and a thick catarrhal exudate appears. From then on we should devote our attention to douching the cervix and keeping the vagina clean.

It is my custom to leave this part of this work practically entirely to the owner or herdsman. Some veterinarians seem
to object to this method, but all that I can say is that I have done this for close on twenty years and still think well of it.

The vagina is to be douched daily with a hot solution until all discharges cease. The veterinarian should make an examination about once a week to determine progress and give any necessary attention or instructions. If there are vaginal complications, a mild solution of permanganate seems to hasten recovery.

If the discharge is entirely cleaned up and all parts feel normal to the touch, the animal is put back into the herd at the end of six or seven weeks. This seems safe since Schroeder and Cotton state they have never found the Bang organism in the uterus or vagina later than fifty-one days after abortion; however, if the cow is slow in cleaning up it is well to continue her in quarantine for at least three months, since in the report of the New York State Veterinary College of 1912-1913, on page 89, it is stated that the Bang organism was found in the uterus of a cow eight and a half weeks after abortion.

I continue the douching of the vagina and cervix for two reasons:

First, I have a fear that abortion is not solely due to the Bang organism and that the vagina harbors organisms that await an opportunity to enter the uterus.

Second, I believe that cervicitis is one of the most obstinate and most frequent causes of sterility, and that constant hot douching is one of the best methods of guarding against acute cervicitis becoming chronic.

In addition to this technic, it is my custom to douche the vagina of all cows in the herd two or three times weekly for two or three weeks before they are bred and every other day after they are bred, until we are certain they have conceived. All cows to be douched again within a week or ten days of freshening in the hope of again cleansing the vagina at a time when the uterus is wide open and exposed.

I am conscious that the value of vaginal douching is questionable, since some seem quite certain that the infection causing it is not by the vaginal route, but like cleansing the prepuce of the bull and irrigating the sheath, it is part of the system that has given me results and I have not the courage to abandon any of it without quite positive proof that it is safe to do so.

Further, I know full well that all this detail is laborious and costly and that it is not always feasible to carry out the entire
technic, but we should do our part and plead with our clients to do theirs as far as they can, and I know of no class of veterinary service that stands out more distinctly professional than to go into a large herd where the loss in calves and non-breeders has been tremendous for years, due, perhaps, largely to quacks and quackery, make an examination of the animals, and be able to discard the hopelessly sterile ones and outline a definite policy that will bring relief, keeping in mind first, last, and always that to keep down sterility as in a case of lymphangitis, we can do more in a few days at the right time, than we can do in months later.

"The Proper Treatment of the Pathological Changes Occurring in the Genital Organs Which Inhibit Conception." This, of course, is an extensive topic in itself. The only comment I wish to make on this subject in this paper is that the method here advocated in caring for the genital tract after parturition itself simplifies the problem of sterility. Where this method is coupled with what might be styled normal care of the cattle, such as reasonable feeding of high proteins, reasonable open air life and exercise, and breeding animals, reasonably soon after normal parturition, instead of delayed breeding, enforced confinement, and injudicious feeding all to make records, we will find that our sterility problems will be reduced to a minimum.

President Dunphy: George F. Jungerman, of Kansas, will lead the discussion.

Dr. George F. Jungerman: I am sure that we have all enjoyed the opportunity of listening to such a great variety of splendid papers. There is noted, however, a great difference of opinion as set forth by different authors. While listening to these papers, I could not help but feel from a practitioner's viewpoint, that if this audience contained very many good practical stock men and producers of live stock, they were perhaps not getting just the things that I would like to have them get.

As a practitioner I am very much interested in the control and eradication of this disease. I know men who are capable and have the specific knowledge to produce animals fit to come into your show here that is going on at the present time in Chicago, go there and perhaps win in the show, but yet if they were present this afternoon, I don't believe that they would have gained very much practical knowledge. I am not finding fault with the papers that have been produced. I have enjoyed them very much, and I am sure I have gained some knowledge from them, but when it comes to controlling contagious abortion, I am sure that it is very essential that the owners of these cattle have quite a considerable knowledge of the disease, of sanitation, of hygiene, and of all of these different things that go along together, and bring about the best results in the control of this disease.

One of the first things to determine is whether the infection in a herd is really abortion disease. If the first symptom was the expulsion of a premature fetus, it would perhaps be an easier matter, but we do not find
that that is the case. I have known herds where the disease existed for a period of four years before there were such results. During which time the owner had sustained great losses from this disease due to retained placenta, mastitis, metritis, and the ordinary calf troubles that we have heard about this afternoon.

Sanitary conditions and regulations perhaps cannot be carried out as readily in my section of the country as in the more restricted dairy districts. I have to do largely with beef animals, but I have been called to farms and ranches time after time to remove a retained placenta. I have taken material from the uterus, and sent it to a laboratory, and the B. abortus was isolated, I also took blood samples from quite a number of these cows, and sent them to the laboratory, and some would come back negative and some positive.

In regard to the agglutination test, I would like to say that in my experience, while it does serve as a means for making a diagnosis, it is not entirely reliable, for we might have symptoms present that would absolutely lead us to believe that several cows in the herd were affected, perhaps they had expelled a premature fetus, and we found the particular discharge accompanying the placental membrane, and perhaps we would get such results from tests that from a clinical viewpoint would absolutely indicate that all these animals were infected.

My work in the past few years has been more in the treatment of sterility. These ordinary calf troubles, in the middle west in beef cattle is where we are sustaining great losses.

I have been repeatedly called to remove these placental membranes, and I have taken some precaution in ascertaining whether or not it was due to this specific infection, and to my satisfaction I have been able to determine that it was. For a period of from two to four years there would be no marked trouble among the calves, or from abortions, and then all of a sudden we would begin to have calf trouble. They would be attacked by scouring, pneumonia, umbilical infection, and other infections. Many of these calves died, some of them soon after birth, some of them lived to be a month or two months old, then seemed to contract this same specific infection and died.

As to the natural habitat of the B. abortus, we would be led to believe by some very able men that it is the udder and the uterus; the uterus only during pregnancy, but they may remain in the udder for a long time, either in a pregnant or in a non-pregnant animal. These organisms are carried by the blood stream, and it seems to me it would be possible for them to be carried from the udder to the uterus at certain times, and be eliminated, and these animals be a source of danger for further infection.

There are certain predisposing causes that sometimes tend to make the loss greater. One is the shipping of animals from southern states into the middle west and northern states, where they have to be acclimated, and this change in climate, food, etc., has a tendency to lower the natural vitality and resistance, making a favorable opportunity for these organisms to get in their effective work, and cause enormous losses.

Secondary invasion, no doubt, plays a great part in the disease, especially if we leave this phase and go into the sterility phase. If the B. abortus has caused a separation of the maternal membrane and the mucous of the uterus, setting up inflammation there to the extent that abortion takes place, the physiological action of the mucous membrane and the
secretion there has been interfered with, making secondary inflammation easy.

I think that we sometimes make a mistake in trying to kill the infection in the uterus. If we use antiseptics of sufficient strength to destroy those organisms, we already have depleted the mucous membrane, and we are very apt to kill some of the tissue cells before we destroy the infection itself.

If has been my practice for the last couple of years to irrigate the uterus with normal salt solutions at about body temperature. This, done frequently, removes all infection, and then by massage through the rectum the natural physiological action of the uterus as well as the mucous membrane may be stimulated.

In handling the ovaries we cannot exercise too great care. We find cystic ovaries, and sometimes ovaries in older cows that seem to be encapsulated by a fibrous formation that is very hard and dense. I have treated ovaries like that, that after my first treatment I felt that I had done no good except perhaps made a diagnosis; but after careful manipulation and massaging, go back a week later and find that the mass had softened up some; in fifteen days it was still softer, and after a few treatments by carefully inserting the hand into the rectum, the ovary could be separated from the entire mass and found to be almost normal. It might not be a pathological condition, but in some cases it is doubt is.

We cannot lay too much stress on sanitation. We should isolate animals that are perhaps spreading this disease. If we could have some positive means of making a positive diagnosis it would be a great step toward keeping a herd clean.

From the viewpoint of a practitioner in the middle west, it is up to us to enlighten the producers of these cattle more and more along the lines of treatment and control of abortion disease.

In regard to treatment, anti-abortion bacterins has not had much mention, and I want to mention it in connection with the ordinary calf troubles especially.

These calves are practically normal at birth. Some of them appear to be strong, vigorous calves for the first few days and then they contract scours or pneumonia, scours in particular, and in such cases I have found that anti-abortion bacterins give better results than any other treatment that I have tried—better than intestinal antiseptic stimulants.

In bad cases of mofritis, I forgot to mention a while ago that after the treatment I described by flushing out the uterus and removing all infected material that we possibly can, after massaging the uterus, I have often tried the injection of from two to four ounces of grain alcohol into the uterus, and by massage see that it gets to all parts of the mucous membrane and the uterine space, and I have had some good results.

Dr. Hadley: Mr. President, I would like to ask Dr. Hallman whether he has attempted, in connection with the work which he described so well with the infection of the genital organs of dairy cattle, to prepare from the organisms which the bacteriologist associated with him isolated, bacterins, and then used them in the treatment of some of the cases that have such abnormal discharges as he has described.

Dr. Hallman: I might say that we have not taken up that phase of the work. It would be very interesting for someone to work on that
phase. There are so many interesting problems in abortion disease, that no one man can take up all of them.

While I am on my feet, I would like to make just a few remarks. You have heard two factions mentioned in the papers this afternoon. Then you have been told by two of the speakers that abortion investigators, abortion workers are divided in two groups, and that these groups are widely separated. I do not believe that those groups are as widely separated as it might appear at first sight. No one doubts the importance of those microorganisms in abortion disease, and I fully agree with Dr. Williams in all he has to say in reference to the importance of the various microorganisms in abortion disease.

I appreciate the definition of the word abortion, as the chairman of the committee has defined it. I believe that I want to work in harmony with that definition, with his idea of the abortion disease. With the meaning that the chairman of the committee has placed on the word, the word abortion does not necessarily mean the expulsion of a living calf or a dead calf. It includes not only all of the various morbid processes which the fetus is subjected to, but it may also include the morbid condition of the newborn calf. It seems to me that one essential point that we must get is some predisposing factor. The conception that I have of abortion disease, is that word dealing with some specific invader, which is a predisposing factor to the morbid conditions that Dr. Williams has described. Maybe it is the abortion bacillus and maybe it is not. Most of these organisms which Dr. Williams isolated in his work under normal conditions do not seem able to establish themselves as the cause of disease, but something, whether it is the abortion bacillus or some other factor, is apparently necessary in order that they may establish themselves and cause the morbid changes which he has so beautifully described.

The fact that we are finding many organisms in abortion disease does not detract from the importance of a primary invader. There are no specific diseases which are not complicated by other microorganisms. In our discussion this morning of swine diseases, it was clearly brought out that a secondary invader in association with the hog cholera virus was an important factor, so I do not think that we detract in the least from the importance of a primary factor in abortion disease.

It seems to me that there is no reason why the work of these two men here cannot be harmonized. I believe that I can agree with the teachings of both of them. I perhaps will differ from Dr. Williams as to the importance of the Bacteria abortus until I am shown that that is not the producing factor, but at the same time I do not detract one bit from the importance of the microorganisms which he has described, which are no doubt of great importance in the control of this disease, and if we are dealing with a primary invader, whether it be the abortion bacillus or some other bacillus, if we can overcome that, the problem of getting rid of the secondary invader will be minimized. If we are dealing with a primary invader, if we remove the predisposing factor, then the other problem would be comparatively easy.

I would like to hear this more fully discussed. These papers, especially the paper of Dr. Cotton, and the committee's report, and the paper of Dr. Williams, are worthy of serious consideration, and I believe this association should take up this question and discuss it. I think it is the most important problem, perhaps, that we as sanitarians have to
deal with today, and we cannot spend the time more profitably than by entering into this discussion.

DR. HADLEY: It might be of interest, in connection with the question that I rose to ask Dr. Hallman, to know that we have conducted some experimental work along the lines which I mentioned, namely, the separation and use of a bacterin of an autogenous nature, those organisms taken from cattle infected with the secondary invading microorganisms, the exact condition which we see before us as sequelae of abortion.

Probably many of you recognize the symptoms and lesions that I have in mind when I recall the condition which we see so frequently in the cervix of an infected cow. You will notice a very red condition, the slimy mucous virulent coating, sometimes a cauliflower-like appearance to the external os. In those cases, though not in all of them, but some of them, we have had truly remarkable results through the use of autogenous bacterin. Within ten days those lesions which I have described almost completely disappeared, and from that red, swollen condition of the os, we have been able to produce a condition which is almost normal.

Our work is entirely in the experimental stage and has been very limited in scope. However, it does seem to me that there is a way for many who have the animals and the laboratory facilities to work with to carry on this particular method and field of investigation, and to possibly derive something of real benefit to the veterinary profession in the control of the secondary diseases, which all admit are just as important probably as any other control, at least, as the primary infection.

DR. HASLAM: Mr. President, since I heard Dr. Williams' paper I believe in 1912 up until perhaps a couple of months ago, I have had the greatest difficulty in reconciling the statements of different men, and in each case men in whose scientific judgment and scientific honesty I have had the greatest reliance. But a short time ago, after reading the latest publication of Theobald Smith, things began to clear up a little bit so far as I was concerned.

We find statements in literature of any number of reputable men who hold that one infection with the bacillus abortus Bang creates an immunity. Yet when you try to follow that out to its logical conclusion, we find instances, and they were such instances as Dr. Williams emphasized in 1912, in which some cow repeatedly aborts.

I believe Dr. Williams stated at that time that the old theory that a cow aborted only two or three times was a fallacy, and submitted data to show that if she aborted two or three times, she was sterile, and the reason she did not abort was because she was not allowed to live and keep on her reproductive action.

Theobald Smith has carried out a most detailed and thorough study upon one group, I believe, of approximately 125 cattle in the state of New York. He does not attempt to generalize, and of course we should be guarded in generalizing from his work; but so far as that herd goes, the first abortions were due to the bacillus abortus of Bang. The subsequent abortions were part due to the bacillus coli communis, in part to pyogens bovis, and to a considerable extent to the vibrio. The disappearance of the bacillus abortus of Bang from the tissues, as emphasized by Dr. Schroeder, and the observation that frequently immunity does follow the first infection lead me to hope that it will be
found in all cases that the second abortions are the result of a metritis following the abortion due to Bang's bacillus.

DR. BOYD: Mr. President, I would like to say in response to the statement made by Dr. Hadley, that we have used in Minnesota bacterin in the surgical treatment of sterility, and our results have been rather indefinite. Our other samples, or where we can prepare bacterins other than from animals that are affected with that sterility, that is, of the uterus and the cervix, we are sure did not need the services of a bacterin, but animals that are suffering from sterility, where the ovaries are affected, it becomes impossible to secure the causative organisms, and we must secure organisms from cattle that have been slaughtered and are suffering with ovaritis or different affections of the fallopian tubes. It seems to me, however, in these cases of septic metritis, following abortion, present before and after calving, in which there is a retained placenta, that perhaps streptococci or an injection of streptococci serum could well be used, and that bacterins prepared from streptococci and other organisms might be helpful in treatment in the handling or preventing of the various calf troubles, being used as preventives. I believe that bacterins are helpful in controlling calf troubles, and possibly in aiding or in effecting a cure in cows suffering from septic metritis, but I do not believe they are very helpful in the treatment of ordinary pyometritis or cervicitis.

DR. WILLIAMS: I wish to compliment Dr. Giltner for having defined what he means by abortion disease. What he has defined today agrees substantially with what I have held. As Dr. Hallman says, there is no particular reason why we should not join hands upon it.

I was rather gratified to find that the committee has recommended maternity stables, and that this is also advocated by Dr. Schroeder. In the work which I have been carrying on, and in the recommendations which I have made from time to time in our annual reports, this feature has been emphasized.

I think that a great many members of the profession have misunderstood me in speaking against quarantining. As I have ordinarily understood the members of the profession, when they speak of the control of abortion by quarantine, and by quarantining the aborter, that is what I have always stood for, at least for a good many years, that is, that animals at the time of parturition, or abortion, should have separate isolated stalls; that we should have maternity stables; that every breeder who has regard for hygiene should have separate boxes for calving and aborting cows; that they should remain in such stalls as a precautionary measure, until they are sound, and if they cannot be rendered sound, send them from that stall to the slaughter house, instead of to the dairy.

I think possibly that many members of this association and of the profession in general, have misunderstood my attitude with reference to the B. abortus of Bang. I have never said that it was not important. I have never believed that it was not important. I have simply expressed doubt regarding certain powers which it was alleged to possess, and have never for one moment doubted its power for harm.

Dr. Hallman in his paper spoke of the B. abortus of Bang being already in endometritis. We have conducted considerable investigation upon the floors of abattoirs, and while we found numerous other microorganisms, it is very rare that we can find in the uterus or in the alimentary
tract of the fetus the B. abortus of Bang; and I have been led to wonder sometimes if Bang, in a certain sense, was not quite right in the suggestion that pregnancy was not essential to the development of the B. abortus, and that in all probability the B. abortus developed rather late than early as a rule in pregnancy, and I suggest the inquiry to Dr. Hallman, when he suggests that the other organisms are secondary invaders and we do not know that they are present in the non-pregnant uterus and in the pregnant uterus, whether he may not possibly turn the other end about. I don't know about it myself.

Dr. Hadley has raised the question of bacterins in cervicitis. We have not tried them in that type of inflammation. We have tried them rather extensively in salpingitis, and ovaritis, and our results have been the same as those of Dr. Boyd's.

In cervicitis we have been able to control the mild and moderate cases by means of antiseptics, and in the severe and persistent cases, we have performed the trachelectomopexy of human gynecologists, and have had very excellent results by the removal of a large portion of the cervix.

Dr. Dyson: Before the discussion closes I would like to get an expression from this association, or some of the committee, as to some practical means of preventing the spread of infectious abortion. Dr. Williams recommends that after a certain period, that is, if you cannot bring a cow back to her normal condition, that she be sent to the packing house. There is no regulation to prevent that cow being sent to the sale ring, which is the most prevalent means of spreading the disease. Is it possible or would it be possible to have some regulation, not one hundred per cent effective, of course, to prevent the sale of a cow to be delivered into a clean herd by requiring that that cow should have dropped a living calf within a certain period, or that the cow was in an advanced stage of pregnancy? Breeders certainly are looking for some help, looking for advice from associations of this kind. We can discuss it from the scientific point of view, but something practical should come out of meetings of this kind.

President Dunphy: We would like to hear from anyone who can give us anything along those lines.

Dr. T. H. Ferguson: I cannot say anything that would be advisable along those lines. The report of the committee covers some few suggestions, and I have been very much interested in Dr. Williams' discussion of abortion disease. I know that the members of the profession that are here and others, will derive a lot of benefit from his paper, as we have from his paper in the past, and I am glad that Dr. Giltner was able to define the Committee's definition of what we call abortion disease, or the word abortion, so as to conform with Dr. Williams' idea more than it did before.

One of the problems in handling abortion disease is this. After a practitioner goes to work in a herd and gets it cleaned up in pretty fair shape so that there are not many actual abortions occurring, he is having good results in the matter of retained placentas, they are coming themselves, or easily removed, in fact the herd is in satisfactory shape, he is controlling the disease satisfactorily to the owner and to himself, and everything goes along smoothly for a year or so, and then something happens, and he begins to look for the cause.

I have had herds of that kind where I thought we had an ironclad cinch on controlling abortion disease, and always on close inspection as to the
causes of trouble I found that the introduction of new animals into the herd had started something.

I could cite one herd in particular that I thought I had cleaned up as far as abortion, calf diseases, etc., was concerned, almost 100 per cent. This herd was making some remarkable records, and everything went on smoothly so long as we were selling out of the herd. A dozen heifers were bought, pregnant heifers, or supposed to be pregnant, from a farm that had had some trouble. These heifers were put on another farm, that is, they were not put in contact with the original herd for a while, and then they were brought down to farm number one and turned in with the cattle, and one of the heifers out of the herd had abortion disease. Half of the heifers that were supposed to be pregnant proved to be open, and they were afterward bred to the herd bull and became pregnant. Those heifers carried through in very good shape, but trouble began in the main herd, in the original herd that we thought was clean. Trouble began and we had almost fifty per cent of abortions and retained placentas in that herd.

Now, what would be the way to prevent that? In my opinion the non-introduction of animals into a herd until they have safely gone through pregnancy would be the only way in my mind to prevent that. The introduction of new animals into a herd that you have cleaned up is a bad practice, if it is a well-bred high-priced herd.

So far as the treatment of abortion disease is concerned, I have been practicing the same method as Drs. Williams, Hallman and others, with very good success. It is not absolutely satisfactory, but I have had fairly good success. We are enabled by that method to pick out cows that have no place in the herd, and send them to the block at once, and we are able to aid the owner considerably.

The majority of owners want something that can be inserted into a cow that will cure the disease right away. They don't want to bother, but those that do—broad-minded men who see the necessity of attacking the situation—are getting good results by employing those methods.

As to the cause of abortion disease, the practitioner has little knowledge of that except what he acquires from the bacteriologist, the laboratory worker, the research worker, and his judgment on that point must be based up their reports, and in my opinion, according to what I have seen from the reports of Dr. Giltner, Dr. Schroeder, Dr. Hallman and others, I am of the opinion that the bacillus abortus undoubtedly is the primary factor in starting the disease, and from practical experience I believe if you get a herd clean so that they are satisfactory, and keep fresh animals from that herd until they have proven able to carry their calves, you can keep them clean. If you introduce fresh animals into the herds, you will have the same work to do over again.

President Dunphy: Is there any further discussion? Let us have some constructive suggestions that will be of help to the breeder, and to the cattle industry of the United States.

Dr. Williams: I would like to reply in part to Dr. Dyson. If a man goes into another herd and buys pregnant cows and introduces them into his herd under strange surroundings, according to my observation they are not likely to be in as good shape as though they had stayed at home, so that method of controlling abortion is not a very good one.

I would say, modifying some suggestions of Dr. Ferguson's that if a breeder wishes to know what he is doing, and take the greatest pos-
sible precaution, let him buy a cow which has passed successfully through the greatest possible number of pregnancies, even if it is two or three, at least one, and take the cow soon after calving, rather than at any other time, and have her genital organs examined to see that they are in good condition, and let her become acquainted with the premises before she is bred. Introducing these animals always incurs the possibility of introducing an infection of a different character, and possibly of greater intensity than the infection already mentioned.

DR. DYSON: I did not make my question plain apparently. I had in mind the idea of preventing the dissemination of infectious abortion from the well-known infected herds that have absolutely no control. A man can sell them as he pleases and send them anywhere where he can find a buyer. Would it be possible by regulation to restrict that privilege, and how far could you go with it?

DR. DIMOCK: Mr. President, I have nothing to say on abortion, I think it has all been said, but I want to make this suggestion, that if the authorities on abortion are able to get together and give us the cream that was presented here this afternoon, that the incoming president should appoint a new committee, and let them get together, and take all these reports and present them so that the breeders throughout the country can have that as a basis for work in the future.

SECRETARY CAMPBELL: Mr. President, the report of the Committee is before the house, and I am wondering if it is not in order for us to say what we are going to do with it. I move that we accept the report and discharge the committee.

MR. GLOVER: I want to emphasize the point that the gentleman made, about getting the cream, or at least some crust from what has been laid before the meeting this afternoon. As the editor of a paper, we receive more letters asking how to treat abortion than perhaps any other question, and it is embarrassing to answer the question by attempting to offer a policy, when I happen to know there is considerable disagreement among the live stock sanitarians of the United States.

I appreciate that we do not know enough about the disease to come to any definite conclusion, but we do know enough now to proceed to treat the animals in the best way.

Dr. Campbell's motion was duly seconded and carried.

DR. DIMOCK: Mr. President, I would like to put my statement now in the form of a motion, that a committee on abortion be continued, a new committee—that the association continue a committee on abortion, and that committee be made up of new members, with the understanding that the work of that committee will be to bring in a summary of what has been presented in the past for our use from time to time.

DR. DEVINE: Mr. President, do I understand the gentleman to ask that this committee be discharged, the question taken out of their hands, and an entirely new committee be appointed?

DR. SCHROEDER: As a member of the old committee, Mr. President, I wish to second this motion that a new committee be appointed.

SECRETARY CAMPBELL: To answer Dr. DeVine's question, it is the custom of committees to make reports, and if the report is complete, and we accept it, that automatically discharges the committee. The new administration can then appoint its own committee.
TWENTY-THIRD ANNUAL REPORT

Dr. DeVine: This says an entirely new committee, as though they were to eliminate the old members. If some of the old members are to be on the new committee, that is all right.

Dr. Schroeder: That is the portion of the motion I seconded, that the members of the new committee shall be entirely different from the old committee.

President Dunphy: I don't believe I could entertain this motion, Dr. Schroeder, because that would be dictating to the new president, whoever might succeed me, what he should do. When I was elected president I was left with a free hand in appointing committees, and I think the next president should have the same privilege.

Dr. Eliason: Mr. President, I don't believe that we ought to be so discourteous to the old committee. There is no question but what they have given us some pretty good results, at least, the people are getting some information as to how to control this disease, and it is not a question of giving a prescription off hand. There is some work that has to be done. Let us be content while some of the investigators are making further research.

Dr. Dimock: I would like to say another word. It was not my intention that this new committee would necessarily do any work on abortion. I think the work is being done wonderfully well, there have been some wonderfully good things presented, but I do believe that when those reports are read by live stock men, they will say that they are far apart, when as a matter of fact they are very close together. We do not want to have the live stock interests think that we are wide apart when as a matter of fact we are not. Let us put this out to the live stock interests of the country in a concrete form, and I believe that a neutral committee, I will call it, can do that better than these men that are working on the disease themselves, because as a result of their findings they will naturally lean this way, that way or the other way, and they are not willing to give up. In other words, let us instruct the incoming president to continue a committee, not to take this committee, but it should be the policy of this association to continue, or have a committee on abortion.

Dr. Giltner: I think Dr. Dimock has the right idea. Originally the committee on abortion was chairmaed by myself, and it has developed during the past three years, thanks to Dr. Williams, who, by the way, is the one that classifies these workers and thinkers on abortion into two groups, and the only one that I know of that makes any such classification. I think troubles have come during the past three years largely because of Dr. Williams and myself. We probably have the record for being the two most disagreeable persons in the world. But it does seem to me that Dr. Dimock's suggestion is very good, and personally I hope that I will not have any connection with this work of the association another year, because we are not getting anywhere. What you need is someone who is neutral, someone who does not know anything about this condition, and I am sure you can get a report that will be satisfactory to all of us.

I do not want to bind the incoming president: I will not suggest that he appoint half a dozen brainless individuals, if there are half a dozen in the association, on this committee.

The editor, Mr. Glover, has asked us for something that we cannot get absolutely. There was summarized in this year's report I think the
knowledge of the world on abortion. I think Dr. Schroeder believes that, and all the members of the committee think that we put in there what we believed to be known about this disease. It is summarized right there.

So far as telling the readers of a live stock paper how to treat this disease, with its manifold complications, I regret to say that that is one of the troubles with the live stock papers, they try to tell such things as that. It is not their function at all. I know some of these papers tell in their advertising columns how to control this disease, and get paid for it. It is the function of the well-trained veterinarian to take care of the complications of this disease. It is the function of the live stock sanitary authorities to do what they can to prevent the spread of such diseases and control them if possible. That is what we asked last year, but we were not bold enough to ask it this year.

So far as that is concerned, the profession could take care of it the same as it has hog cholera; it could be checked if the live stock sanitary authorities would undertake it. I admit it would take a lot of time and a lot of money, a lot of trained men, intelligence, perseverance and so on, and we must admit that they have about all they can handle with their other duties.

I know a millionaire who has an exhibit of Angus cattle out here at the show now, a man who owns a newspaper, who sent his editor up to the college to talk to Dr. Hallman, and who even went so far as to ask that this matter be taken up at a special session of the legislature.

Now, if many men held the views that Dr. Williams does, that the measures that this committee has advocated will upset the live stock industry, that the live stock industry would be ruined by the efforts to combat this disease through regulatory and legal measures, there are certainly a great many live stock men who are pleading for these regulatory measures. I do not think that this association or any committee appointed by the association should now, or possibly in the near future, outline what might be termed uniform regulations for the control of this disease, unless they be very, very simple and general in their character.

The disease has some peculiar geographic variations, due to the various methods of keeping cattle in various sections of the country. The American form of government is peculiarly experimental in nearly all of its phases. We undertake things in North Dakota that we would not dream of doing in Alabama. Things are done in Oregon that the New England states would not think of undertaking. So it is with the control of these diseases. Each state must undertake to control, as we tried to point out last year, in such manner as the intelligence of the officials and the individuals involved dictate, and the time will come after the various states have undertaken measures, when we can discuss fruitfully the harmonizing of results. But if this association waits until uniform regulations of a specific nature can be outlined, they will wait a long, long time, and then after outlining them, they will find that they will not be applicable to the various states.

I want to thank the association for the courtesy that they have extended to the committee, myself particularly, for the three years' indulgence that it has permitted us.

MR. GLOVER: I don't want Dr. Giltner to think that I do not appreciate this great problem that is before you. I do not believe there is a man here that has done more to assist in this work and in getting financial aid than I have. I have never said much about it, but I have
gone to Congress and got money that the United States government might employ technical men, bacteriologists, chemists, and so forth, and the appropriation was made at my solicitation alone. We look upon this disease as a peculiar one, that requires the best scientific men in the country, but Dr. Giltner forgets that there are thousands of men owning cattle over this country that have not the opportunity of securing the services of a veterinarian, and they are asking for just what he closed with, some simple operation for handling their herds, and it has seemed to me for some time that we might be in unison in this great organization, on those simple methods. That is all I am asking for, common treatment, more than in a scientific way. I have had some veterinary training in my time, and I understand the application of a great many of these things that require trained hands and trained minds to execute, but I do hold, gentlemen, that there are some simple things that can be applied by the farmer, where he cannot get in touch with a veterinarian, and that he should be advised of those things, and that is all I am asking.

PRESIDENT DUNPHY: If there is no more discussion, I believe there is a motion before the house. I have allowed wide latitude on the question in regard to that motion, owing, I might say, to the very prominent part that contagious abortion is playing at the present time all over the country. Now, this motion before the house by Dr. Dimock, seconded by Dr. Schroeder, was, that the incoming president be instructed to name a committee, or continue a committee on contagious abortion. It does not specify whether he shall use any of the members that have been in this capacity previously, and I do not think that it should, but the continuation of a committee on contagious abortion is an important matter in connection with this association. You have heard the motion. Are you ready for the question?

DR. DEVINE: If the minutes are certain as to the way that you have just stated the question, the language that you have used, if Dr. Dimock adopts that as the language he wishes to use, all right, but I want that clearly understood.

DR. DIMOCK: I will adopt that language.

PRESIDENT DUNPHY: Dr. Dimock accepts the language of the president.

Dr. Dimock's motion prevailed.

PRESIDENT DUNPHY: There is a report of the Executive Committee that I would like acted on.

The secretary here submitted a list of applications for membership with the recommendation of the Executive Committee that they be elected. (See list elsewhere in this volume.)

SECRETARY CAMPBELL: The Executive Committee recommends the appointment of a committee of five to formulate uniform regulations for the transportation of hogs by express in crates and from the stock yards and to urge upon the federal government and all state governments the amendment of present laws and regulations to conform as closely as possible to such uniform regulations.

PRESIDENT DUNPHY: We have taken in a large number of new members, and I feel there is still opportunity to secure more members during this meeting. I would like all members who have friends here, to solicit their membership. The stronger we make our association, the more influence we can have in the future.
The convention adjourned to Wednesday, December 3, 1919.

Motion duly made, seconded and carried for the adoption of the recommendation.

SECRETARY CAMPBELL: This recommendation of the Executive Committee does not require any action of the association. There seems to be some misunderstanding as to who is eligible to membership in this association and who is not. This is an attempt on the part of the Executive Committee to define eligibility for membership in the association.

The Executive Committee regards officials and employees of the Bureau of Animal Industry, state live stock sanitary officials, breeders of live stock, editors and publishers of live stock and agricultural papers and magazines, and others interested in the live stock industry as eligible to membership in this association, and members are urged to procure as many desirable applications for membership as possible from these fields of industry.

FIFTH SESSION
December 3, 1919,
9:00 A. M.

Meeting called to order by Dr. Anderson as chairman.

CHAIRMAN ANDERSON: The first upon the program is the report of the Committee on Diseases, Dr. L. Van Es, chairman. Dr. Van Es not being present, Dr. Campbell will read the report.

SECRETARY CAMPBELL: In the letter of transmittal accompanying this report, Dr. Van Es said he had not been able to have a committee meet and that this report is merely his own and not the report of the committee. He marks it as a tentative report.

TENTATIVE REPORT OF THE COMMITTEE ON DISEASES.

By L. Van Es, Lincoln, Neb.

A committee on "diseases" without specific and more or less definite instructions in regard to its duties and functions is very much like a ship without a destination and perhaps along with similar perfunctory committees, is as much at sea. It is thus with a feeling of uncertainty that the writer presents the following considerations in order to comply with the secretary's request for a report of said committee.

It is quite probable, if not quite certain, that a report of a committee on diseases should contain a carefully digested statistical review of the occurrence of animal diseases, the progress made in their control and their cost to the nation. This, however, is not possible, because the statistical data required for such a report are not available. We have, no doubt, some figures on disease, but as a rule they are either so slow in
coming to the surface or pertain to such a small part of our live stock population, that they have merely a historical value and are of little or no value in guiding our efforts along the lines of disease control. The few reliable data which we possess usually pertain to single projects or to the sanitary work done in individual states. The remainder of our figures are commonly estimates, subject to a large factor of error.

Yet the possession of reliable and recent statistics on the prevalence of disease constitutes in reality one of the most valuable factors in making disease control successful.

As already stated, we have some valuable data on certain isolated and detached projects of disease control. The rather frequent and up-to-date statements of some state sanitary organizations and the Bureau of Animal Industry in regard to the progress made in tick extermination, the accrediting of tuberculosis free herds and the meat inspection service are good examples, but would it not be possible to extend this further and to make these statistical efforts a nucleus capable of growing into a general statistical service designed to furnish a constantly available gauge of the disease situation. Furthermore, would it not be imminently within the scope of the functions of this organization to seriously study this problem and to inaugurate a movement looking forward to the creation of a central agency for the gathering and prompt publication of statistical data pertaining to this important phase of live stock sanitation?

(Referred to Committee on Resolutions with instructions to present a resolution expressing the sense of this association on the advocacy of a policy.)

But even without statistical assistance of great magnitude and precision, we are able to record some instances of splendid progress in live stock sanitation.

In the first place we may point to the splendid achievement in tick eradication. In fact the whole story of the Texas fever problem from the discovery of the piroplasma and the part played by the tick to its now approaching extermination is one of the finest examples of sanitary progress. When we contemplate the great efforts and persistent research work necessary to bring to light the facts relating to the riddle of Texas fever etiology at a time when there were no precedents to guide, when we witness how, in spite of the most difficult obstacles, the revealed facts are being followed to the logical conclusion that the tick must go, we are impelled to do homage to those
who furnished the initiative and those who are still engaged in bringing the great work to completion.

With an equal degree of confidence in ultimate success we see the tuberculosis eradication campaign get under way. We feel that it cannot fail because it is based upon simple facts learned in a difficult school and upon a most democratic understanding between live stock sanitary authorities and leaders among live stock owners. We have not only learned the most essential facts about this disease, but through many failures of our own as well as those of other nations, we have also come to recognize the fundamental fact, that the man who owns the animals is the principal factor in making live stock sanitation either a success or a failure.

In the face of extremely fatal and spectacular diseases, the wishes of owners may sometimes be successfully disregarded, but in dealing with tuberculosis this has never been possible. Now that the growers and breeders of cattle have come to see what tuberculosis means to them, the absolute control of the disease has become a possibility, the realization of which is subject only to the support received from herd owners and the size of the organization which can be kept at work in the field.

The hog cholera situation likewise can be regarded as more satisfactory than it has been for years. To be sure, the disease is still causing considerable loss, but it is quite apparent that in the great hog-producing states at least the last year or two have been marked by a great improvement. We believe that much of this can be ascribed to the intelligent use of protective serum, although, no doubt, a natural periodic decline of the disease may also be credited with the lessening of the disease.

But while we may congratulate ourselves upon this improvement, we should not for a single moment cease our efforts to cope with the disease. In fact, now that in many regions hog cholera is apparently at a low ebb, it seems that we really have reached the long wished for phase, when we can begin to think of and to act toward the actual suppression and eradication of this heavy incubus on our swine-growing industry.

When the country was overrun by the disease, when the greater part of our territory constituted practically one gigantic outbreak, we did well to merely limit the ravages to a greater or less extent. The task of live stock sanitation now is to deal with isolated outbreaks, to root them out and to hem them in by proper control measures, among which the immunization method must remain a prominent one. We must not again
have such a general outbreak as confronted us five or six years ago, and now seems to be the proper time to get in the most telling blows in order to bring this about.

If the swine industry can be freed from the hog cholera losses, its greatest risk will have been eliminated. No doubt there are other communicable diseases to which the hog is susceptible, they may in certain instances be even important, but they are by no means so generally prevalent as to be a national problem.

We fear that far too much heed is given by veterinarians and others to the propaganda carried on in association meetings and by a system of commercial pamphleteering in favor of the great importance of hemorrhagic septicemia and "mixed infections" among the diseases of swine. Most of this propaganda, if not all, can be traced to persons engaged in the manufacture or sale of so-called "bacterins," represented as being immunizing agents against swine diseases other than cholera and it has often been accepted without challenge. This whole subject is badly in need of disinterested investigation. Perhaps swine are subject to hemorrhagic septicemia as a distinct disease and we may grant that what our veterinary merchants call "mixed infection" plays a part in hog cholera cases, but there is as yet no great certainty that they, per se, contribute very much to our swine losses and that if they should do so, those losses can be at all reduced by the use of "bacterins."

We should suspend judgment until more can be learned about the subject, and in the mean time not lose sight of the fact that hog cholera is yet the American swine growers' greatest enemy.

Abortion disease of cattle continues to be a vexing problem to some extent because our knowledge of the biology of the disease is as yet imperfect. Here also the task of the investigator has not yet been finished. It is encouraging, however, to note that the disease is being more and more recognized as being of enormous importance and that cattle breeders are beginning to apply such sanitary means as can be logically advocated against the spread of the disease.

What is particularly needed in regard to abortion disease is continued and thorough research. Eventually the accumulation of facts resulting from the investigator's labors will enable us to devise ways and means to cope successfully with this difficult situation.

Other diseases likewise should become subjects of experi-
mental inquiry. Among these we mention the pneumonias of sheep and swine. The former is often a source of grievous loss to a most important branch of animal husbandry, while the latter also is often a perplexing problem. Of either we know very little and careful studies and observations are badly needed. It is not enough to glibly talk of "hog flu"; isolate some of the organisms present; grow them in cultures; and then kill and sell them as the proper remedy.

Disease control is not so easy as this and without a tedious and painstaking gathering of facts we can never hope for much permanent success. All our disease problems must be attacked from the bottom up. No other way is open.

The report of the committee was accepted, and the committee discharged.

DR. HASLAM: Mr. Chairman, I would very much like to have Dr. Schwarze give the result of some of the investigations he has been making on hog diseases.

SECRETARY CAMPBELL: Dr. Schwarze is not here this morning. With regard to one of the recommendations of Dr. Van Es, regarding the collection and publication of statistical data with reference to the existence, the occurrence and control of disease, I just received this morning the current issue of the Public Health Report, as published by the United States Public Health Service, and the two opening paragraphs apply exactly to that paragraph there, in which he makes a recommendation. I would like to read it. The heading is: "Sickness Records for Industrial Establishments."

"No factory management, employees' organizations, or public health agency, can control or prevent sickness without knowing when, where and under what conditions sickness actually occurs.

"This knowledge is essential, and not simply for a single day or month or year, but continuously. Eternal vigilance is never more necessary than in the control and prevention of disease, and this oftentimes can be maintained only by the systematic report of sickness. The sole influence of many conditions, harmful or helpful, cannot be recognized and evaluated unless records of ill-health are currently available for observation and study in connection with a knowledge of the conditions under which people work and live. So well recognized is this fundamental principle, that the effectiveness of a City Health Department is judged in large measure by the accuracy and completeness of its morbidity reports. For without dependable and prompt records of what sickness actually occurs, a Public Health Agency is blind."

There are two or three more pages of the same import, pointing out forcibly that the location and occurrence of disease is the most elementary, fundamental basis upon which to organize and conduct all sorts of measures, and is something that has been largely overlooked in the United States.

In Illinois there has been a regulation of the Department of Animal Industry that requires veterinarians to report every contagious disease that they are called to see, and a fine for failure is fixed at $500. It is not up to $500, or anything else. It is just $500, and there are other
penalties that go along with it. A man's license can be revoked for failure to do that. It is a new regulation, and I think it has not been fully enforced yet, but it probably will be, and there are probably similar regulations of that kind elsewhere.

I move that Dr. Van Es's recommendation in this report of the Committee on Diseases, that steps be taken at this time to establish the Bureau for the Collection of Statistical Data, be referred to our Committee on Resolutions for report back to this association this afternoon. Then a resolution could be brought about merely stating that in our opinion such is advisable, or it might go further and indicate where such a bureau should be established. I make that as a motion.

Motion duly seconded and carried.

CHAIRMAN ANDERSON: The next on the program will be the Report of the Committee on Special Skin Diseases, by Dr. B. H. Ransom, of the Department, Washington.

REPORT OF COMMITTEE ON SPECIAL SKIN DISEASES

Sheep Scabies

By B. H. Ransom, Washington, D. C.

It has been assumed by your committee that the term "special skin diseases" was intended to apply particularly to scabies of sheep and cattle. In any case this report has reference to these diseases.

During the past two years, there have been numerous outbreaks of scabies in cattle and sheep in new localities as well as in localities in which scabies was formerly prevalent, caused largely, it is thought by the weakening of sanitary police measures on account of the calling to the colors of large numbers of experienced men, whose places were either left vacant or filled with inexperienced employees, and by prolonged drouth in the southwest and northwest range states, which made it impracticable, and in numerous instances impossible, to conduct dipping operations.

There is appended hereto a statement (Appendix A) showing the distribution of infection with psoroptic scabies of sheep and cattle in the several states during the period November 1, 1918, to October 31, 1919, as reported to the Bureau of Animal Industry by its inspectors and by state sanitary officials. It is evident from this statement that these diseases are uncomfortably prevalent and that the situation demands close attention on the part of both state and federal authorities if it is to be prevented from becoming much worse. Briefly summarized, this statement is as follows:

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<th>State</th>
<th>No. of Bands</th>
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<tr>
<td>Arizona</td>
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### Psoroptic Scabies in Cattle

**November 30, 1918 to October 31, 1919**

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<td><strong>Total</strong></td>
<td><strong>1,431</strong></td>
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### Sheep Scabies

Number of states in which infection was found, 29.
Number of infected bands, 2,772.
Number of animals involved, 2,564,333.

Eleven counties in Texas, ten counties and one island in California, and three parishes in Louisiana, an area of approximately 56,000 square miles, are still under federal quarantine for sheep scabies.

**Cattle Scabies**

Number of states in which infection was found, 14.
Number of herds infected, 1,431.
Number of animals involved, 205,784.

In addition outbreaks of sarcoptic scabies of cattle have been reported from seven states, and chorioptic scabies of cattle from one state. The reports on sarcoptic scab however are very incomplete and there are probably few states entirely free from this disease.

The federal quarantine for cattle scabies has been entirely released and at the present time outbreaks of the disease are handled by local quarantine imposed by state officials.

**Psoroptic or Common Scab**

In the control and eradication of psoroptic scabies, the items of primary importance are as follows:

1. Prompt quarantine of infected animals.
2. Dipping only in approved dips.
3. Supervision of dipping by experienced federal or state employes.
4. Frequent testing of dipping solutions with field tests.
5. Necessary disinfection of infected premises, and protection of treated animals from exposure either to infected premises or to untreated animals that may be scabby.

With reference to Item 1, it is absolutely essential in the control of psoroptic scabies as soon as notice is received of infected shipments from the localities under their direction, that local live stock sanitary authorities act promptly by quarantining and holding under strict quarantine all animals and premises involved, until proper treatment has been given and complete eradication of the disease from the premises has been secured. Otherwise no effective control of the disease can be obtained and the work of inspectors at market centers is largely wasted.

As to Item 2, the method of dipping for psoroptic scabies is more or less familiar to all. It consists in dipping infected animals twice, 10 to 14 days apart, and exposed animals once, in an approved dip in proper dilution.

The importance of Item 3 should be self-evident, as obviously proper treatment can not be given by inexperienced and irresponsible persons.

The testing of the dipping bath referred to in Item 4 is highly important. Field tests for approved dips are available and the
practice of frequently testing the bath during use should not be neglected as it is very liable to become too weak to be efficacious with consequent failure of the treatment.

Item 5 is also frequently neglected and reinfection from untreated animals or from infected yards, cars, etc., is apparently not a rare occurrence, following treatment, though it is sometimes difficult to decide whether reappearance of the disease is the result of reinfection or of faulty treatment.

In addition to these 5 items your Committee also offers another recommendation concerning sheep scabies. The dipping of feeder sheep before they are introduced into feed lots before fattening is believed to be a highly important measure in preventing the dissemination of scabies infection throughout the corn growing states. During the winter, however, weather conditions often make dipping impracticable. It is therefore recommended that in the case of those states that have regulations requiring such dipping that provisions be made for the importation of feeder sheep during extremely cold weather without dipping at the point of origin or market center but subject to dipping or quarantine on the owner's premises at destination.

Sarcoptic Scab of Cattle

The general measures mentioned in the case of psoroptic scab apply also in the control and eradication of sarcoptic scab, although a cure is not so easily effected. The treatment, however, is materially different, consisting of several dippings about six days apart in an approved lime and sulphur dip or one or two dippings in crude oil. It has been shown that sarcoptic scab may also be cured by repeated dippings in nicotin and sulphur, but it is believed by your committee that the nicotin treatment is likely to be more uncertain in the case of sarcoptic scab than treatment with the other dips mentioned, though this point will bear further investigation. As it embodies some very useful information that seemed to your committee to be of interest to this association, there is attached hereto a separate report of the treatment of range cattle affected with this disease in Colorado, nicotin and sulphur being used.

A Practical Experience in the Treatment of a Large Herd of Cattle Affected with Sarcoptic Scab.*

*Abstracted from a report by Dr. John Dickson, Field Inspection Division, Bureau of Animal Industry.

Cattle on two ranches in North Park, Colo., belonging to the same company and comprising 6,500 head, among which were numerous cases of sarcoptic scab, were dipped in nicotin sulphate, 0.05 per cent strength,
plus 2 per cent flowers of sulphur. Those on one ranch comprising 3,500 head were treated under the direct supervision of Dr. Dickson.

About 12 per cent of the animals showed definite infection in varying stages of severity, some of them being grossly infected and though well fed so emaciated and weak that 4-year-old shorthorn bulls among such animals could easily be thrown by a tail swing. About a dozen bulls, 4-year-olds and under, had died, apparently from the disease, before the herd was treated. The financial loss in the bull herd alone on account of the disease was estimated at not less than 7 per cent, one important factor in the loss resulting from the fact that many of the bulls apparently cured after treatment will nevertheless not be fit for breeding for several months. The manager of the ranch considered the loss to be greater than 7 per cent.

Portions of the body affected included the ears, face, cheek, intermaxillary space, throat latch, brisket, front of shoulders, lower chest between forelegs, back of upper arm, skin covering protractor ligament of sheath, sheath, inner and posterior faces of thighs, perineum, depression at side of tail, tail, loins, and posterior portion of shoulder.

There was little thickening of the skin on the affected parts, except in cases where hand dressing had been resorted to prior to dipping. The skin was granular, but the heaping scab as observed on pigs was absent.

Considerable difficulty was experienced in properly treating the animals, because of lack of labor, mixing of the two herds (infected and exposed animals, into which the cattle were divided) and various other unfavorable conditions commonly met with in diking in the field but usually not so complicated as in the present instance. It was originally planned to give the entire herd five dippings, but conditions made this impossible and only the infected animals were given the entire course of treatment.

The animals found infected at each dipping were separated from the others, marked by painting for later identification, and added to the infected herd. The animals classed as exposed were dipped only three times several days apart over a period of 14 days, between May 5 and 19. The animals found infected were dipped two times in addition, or five times, and twelve head were dipped eight times. For inspection, in order to pick out the infected cases six animals were admitted at a time into a pen 30 by 40 feet, the inspector standing with his back to the sun, parading the cattle back and forth, which gave a good under-line and inner thigh view. Then the animals were herded into the corner and the tails elevated with an iron hook on a broom handle and drawn aside so as to examine the thighs. The importance of raising the tail in inspection was shown by the case of the three fine looking steers which showed only small lesions not over two inches in diameter located in the fold of the perineum.

All animals were held in the dip two minutes at the first dipping, and the infected ones at least two minutes at each subsequent dipping. The infected animals were dipped separately, the temperature of the vat being raised to 104 or 105°; whereas the temperature for the other animals ranged as low as 98°. The strength of the dip was tested frequently, and it is believed should be tested once for every 500 animals dipped in a 7,500 gallon vat.

Infected heads and faces were given special treatment by frequent plunges beneath the surface of the dip and by scrubbing with brooms,
two men wielding brooms for each animal. In only one case (base of horn) was the kerosene treatment mentioned below, applied to the head.

In a considerable number of cases kerosene was applied to affected areas of the skin by rubbing over them a piece of gunnysack soaked in kerosene. The skin was not severely blistered by this treatment, only enough to raise the epidermis in lamellar plates. The vesicles present before the kerosene application disappeared. The kerosene was applied 48 hours after one dipping and four days before the next dipping.

Hand-dressing by owners before dipping seems likely to be a bad practice. In the present instance a coal-tar creosote dip had been used in some of the cases, applied too liberally and too strong, with the result that the skin became so thickened with scabs from irritation that no dip could penetrate it, and these scabs had to be removed, a hoe being employed for the purpose.

Sickness from the nicotin was common among the dipped animals, developing generally within 15 minutes after leaving the bath, and lasting not over three or four hours. If animals showed great distress relief was afforded by a dash of cold water in the face.

Newly affected or mild cases responded promptly to treatment; in several cases four days after the second dipping there was no evidence that the animals had ever been affected. On the other hand, grossly infested animals responded slowly and apparently no definite control of the disease was obtained until after the third dipping that is, there seemed to be no change in the general appearance of the animals. In one case living mites were obtained from the animal after the third dipping, but this is believed to have been from reinfection, owing to the fact that this and certain other animals that continued to show clinical evidences of the disease, used a manure pile as a feed and bed-ground to which they habitually returned after dipping, a condition finally corrected after the third dipping.

Notwithstanding the difficulties encountered, the treatment used seemed to result successfully as judged by subsequent inspections, though these were made too soon after treatment for final conclusions to be drawn.

Judging from the results obtained in the present instance, it would appear that sarcoptic scab in cattle can be cured by five dippings at intervals of five or six days, using 0.05 per cent of nicotin, with 2 per cent flowers of sulphur. Rubbing the affected areas of the skin lightly with kerosene between two of the dippings appears to be a good procedure. Heads and faces should be well scrubbed during dipping.

Nicotin seems to have little affect in preventing reinfection after dipping.

It is believed that five dippings should be required in the routine treatment of cattle affected with sarcoptic scab if nicotin dips are used.

Sarcoptic scab of cattle has been reported during the period, November 1 to October 31, from the following states: Montana, Colorado, Nebraska, Iowa, Texas, Vermont, and Oklahoma. It is, however, much more prevalent than indicated by the incomplete official reports received by the Bureau of Animal Industry. It is a disease that seems particularly to have been spread by pure bred cattle. As the lesions are often very inconspicuous great vigilance is necessary to avoid its introduction
into herds formerly free from it, especially as it may prove very destructive and as its treatment is so difficult.

**Chorioptic Scab of Cattle**

This disease caused by the mite known as *Chorioptes bovis*, not often observed in the United States, has been recently found in Vermont. The mite is rather similar in appearance to the psoroptic scab mite. The lesions resemble those of psoroptic scab and are usually found on the tail or legs, ordinarily showing little tendency to spread to other parts and usually spreads slowly from one animal to another. The same treatment applies as in the case of psoroptic scab. The disease was reported by Dr. DeFossett of the Bureau of Animal Industry in March of the present year as occurring in a herd of cattle near Chester, Vermont. This report was confirmed by an examination of swapings sent in to the Zoological Division of the Bureau, the presence of the mites of chorioptic scab being discovered in the specimens. A large number of herds in the same locality were affected with sarcoptic scab, and psoroptic scab was also common.

Chairman Anderson: You have heard a splendid paper on this subject, and I hope you will all take part in this discussion promptly, and thresh this matter out to your satisfaction.

Dr. Torrance: (Canada) Mr. Chairman, in connection with this report, I had the honor to be a member of the committee, and I will make a confession, that I am not responsible for anything that is stated in it, for the reason that I did not take any part in any meeting to consider the report, but I fully concur in everything that Dr. Ransom has said. I had the opportunity of reading this report, and found it intensely interesting. I am glad to say that we have no sheep scab in Canada, and have not had for some years. So far as cattle mange is concerned, we have portions of the northwestern territory in Canada which have been infested with cattle mange for some years, and we have this area under restriction. It is known as the mange area, and we have been making persistent efforts to clean it up, and we hope that our efforts this year will be crowned with success.

One of the great difficulties in cleaning up a range country from mange is the difficulty of getting an absolutely complete gathering of the cattle for dipping purposes. In a broken country, covering many square miles, full of ravines, gullies and patches of scrub, it quite often happens that a cow, a calf, or perhaps a few cattle, will be left concealed in some depression of the ground, and are not dipped, and then they mingle with the balance of the herd, and gradually bring this condition back.

This difficulty is one inherent to the range country. In a fenced country every animal can be dipped with absolute certainty, and the difficulty of eradicating mange is not great.

One essential, however, is to see that the strength of the dip is kept up, and fully maintained, until every animal is dipped. We find it also
highly important that the temperature of the vat shall be maintained. Dr. Ransom mentions a temperature of 105°. We have found in the northwest that a higher temperature within reason gives a better effect. Our lime sulphur dip is the one that is used always, and we try to get temperatures up as high as 115°. Sometimes we get them as high as 120°, and we have no bad effects from them. You might imagine that such a high temperature would scald the animals, but it does not, and we find that the higher the temperature within reasonable bounds, the better is the effect.

The report was accepted and the committee discharged.

CHAIRMAN ANDERSON: Owing to the fact that Dr. Marshall has an engagement at about the time his paper would come on the program, he will be called now to give his paper on "Changes in the Live Stock Industry."

CHANGES IN THE LIVE STOCK INDUSTRY

By F. R. Marshall, Washington, D. C.

Senior Animal Husbandryman, Bureau of Animal Industry,

It is my object briefly to review some of the more striking changes in our live stock business during recent years. Like every other line of industry, the live stock business is constantly changing. This is necessary in any progressive line in order to meet the requirements of the inevitable developments in every phase of our national life.

Since this association was formed, a very marked change has been experienced in the production of all classes of meat animals. The types of cattle, sheep and hogs that were given honors at the International Show of seventeen years ago would not command serious attention today. At the same time, the methods of feeding and systems of production have been very generally and seriously modified. It is necessary and desirable that the methods of safeguarding the health of our farm animals should be modified, improved and extended, in accordance with the evolutionary changes. I also believe that the conditions that have come about and the further findings that are imminent make it incumbent upon all those entrusted with live stock sanitary work to see to it that the field of their operations is extended to include not only protection from outbreaks of contagious diseases, but also to secure that maximum degree of health and thrift which is necessary in securing the greatest possible rate of increase in live stock and also the most economical production of meat for food.

The fundamental importance of every form of health control rests, of course, upon the varying demands of feed production
for a population. The question is now a most serious one in the minds of consumers, and what concerns consumers of meat cannot be ignored by producers. I believe it will be agreed by most of us that so far as relief from high prices for the consumer is concerned that he has more grounds to hope for aid through more efficient distribution than as a result of lessened cost of production on the farm or ranch. At the same time, no matter how completely producers may demonstrate their innocence of any charge of profiteering or receipt of undue profits, they cannot be oblivious to the danger of injury to their business through a serious reduction in our home market demands as a result of ruling high prices. As time goes on, the necessity of a larger and more general system of live stock raising becomes more and more apparent if permanent and self-supporting systems of farming are to be maintained. It may be theoretically possible to continue crop production without reliance upon live stock feeding, but there is no room for argument as to the profitableness of such a course. Live stock production is essential to most successful agriculture, and in order to insure the largest and most profitable outlet it is always imperative to follow the most modern and economical lines of production either in times of high prices or of low prices. I am firmly convinced that the most economical conditions surrounding the production of the future call for larger attention to many conditions affecting the health of animals which do not now receive the consideration given to diseases contagious in character.

Changes Since 1900

During recent months considerable prominence has been given in the press to the statements reported from the Bureau of Crop Estimates, of the Department of Agriculture that our total meat production in 1918 was 24 per cent higher than in 1900. It is erroneous to consider the statistics of 1918 as a reliable measure of the present annual production capacity of the country. The average of production for 1916, 1917 and 1918 show that in these three years the total amount of meat slaughtered was 11 per cent over that of 1900. During the same time there was an actual decrease of over 2 per cent in the actual amount of beef produced, 10 per cent in mutton, and these two decreases were offset by an increase of 25 per cent in pork production.

Changes in Western States

The sources from which these decreases and increases are reported are of interest from a sanitary standpoint because they
show significant changes in live stock affairs in several parts of the country. A great deal has been said about the decline of stock raising in the range states. Between 1910 and 1919, 72 per cent of the 712,000,000 acres in the public domain has been taken up. This has not meant so large a reduction in live stock raising as was so commonly supposed. It is true that a large part of the range stock grazes upon government land, but this removal from public domain represents the transferring of considerable areas which are still utilized for grazing purposes. The withdrawals of 1917 and 1918, however, which amount to over 40,000,000 acres, represent a more serious encroachment upon the live stock industry. The withdrawal of these last two years represent chiefly homesteadings under the 640-acre provision. These lands, while really of grazing character, are being largely entered upon by people who cannot for many years at least become live stock raisers in a practical way.

Taking the states of Wyoming, Montana, Idaho and Utah as representative of the range area, we find that since 1915 a number of cattle, other than milking cows, are represented as increased by 33 per cent. This does not include the serious changes occurring during the year 1919. At the same time, the number of sheep in these four states declined by 10 per cent.

These figures do not tell the whole story of the change in the range states. The reduction of the number of range animals has been to a considerable degree offset by the increase in the number of cattle and sheep raised or fed by farmers on irrigated lands. To an increasing extent these lands are furnishing marketable stuff and also feeding out some of the stock formerly shipped to the Corn Belt. These changes have all had their effect in lessening the supplies of feeder cattle and sheep available for farmers of the Middle West from the range and have already given a new angle to live stock raising on the higher priced grain lands.

Southern Development

While these changes have been developing in the West, an even more significant change has come about in the live stock business of the southern states. Between 1915 and 1919 the “other” cattle population of Alabama, Florida, Georgia, Louisiana and Mississippi increased by 36 per cent. At the same time the number of hogs in these five states increased by 42 per cent. These additions to our cattle population in the case of cattle amount to a 3 per cent increase in the entire country, and a small per cent increase in the case of swine. These rates of in-
crease, however, while comparatively small in relation to the entire number in the country, are more significant as evidences of the larger developments sure to follow in the South and in the southeastern states. At the same time the change in numbers has been even less significant than that in quality. The numbers of improved live stock of various breeds taken into those states are sure to make them very important sources of our future meat supply. While these sections may to some extent furnish the central states with some of the feeder cattle formerly secured in the West, it is not to be expected that the increase of such stock from that source will relieve the Corn Belt feeders’ difficulty in respect to feeder cattle. Feeder hogs are also coming in considerable numbers from southern states, and it is quite probable that this may be an important factor in the Corn Belt states live stock business.

**Effect of Changes in the Live Stock Business**

If one looks only at the present condition of the meat animal industry in the western and central states it becomes apparent that we have reached the limit of production under old methods. The limit of outlet will not be reached unless it comes about as a result of continued prohibitive prices.

The average consumption of meat per capita in 1916, 1917 and 1918 averaged 16 per cent less than in 1900. If this rate of consumption is to further decline it will be greatly to the disadvantage of consumers generally, as well as unfavorable to the producing industry.

The enlargement and improvement of live stock raising is no less imperative from the standpoint of successful and permanent system of farming.

If the demands of both sides of the question are to be met, a very serious modification of the Corn Belt live stock production system must occur. This is not a new doctrine, as there has for some time been a tendency toward larger breeding of stock on Corn Belt farms in substitution for dependence upon a system of using the crops for feeding thin stock obtained from the West. The richer farming sections are steadily coming to a system such as obtains in Great Britain, under which the live stock is chiefly marketed from the farms upon which it was born. There will no doubt always be considerable supplies of stocker and feeder cattle and sheep from the drier sections of the country, but these cannot be expected to supply the requirements of the grain-producing states.
With a more dense live stock population on farms of the central states, the health question becomes more important and more difficult. Under conditions of high productive expense and high priced land, the matter of low cost of production is also more imperative. Low rates of increase, losses during farrowing and lambing, lack of thrift resulting from lambs that are unhealthy but not dangerous in the sense of having diseases directly communicable, all constitute very serious drags upon the most complete development and improvement of live stock production.

**Need of Health Control of Sheep and Lambs**

I can best illustrate the idea of more thorough control of animal health by reference to the present condition of the sheep industry in the older farming states. Beginning a few years before the war, wool and lamb prices began to change in a way that gave sheep raising a new interest to farmers accustomed to rely upon grain selling or upon their cattle or hogs' alone. This new price era is a result of world conditions in the wool trade and has assurance of permanency. The farm labor problem brought the economical advantages of sheep raising still more strongly to the front. There is every practical and economic reason to look for steady and large development in sheep raising as a permanent part of better balanced and more profitable live stock farming. As with every new line of enterprise, its own peculiar difficulties arise and there must be education and demonstration before the treatment of these obstacles can be fully understood. The hindering and limiting factor in the logical expansion of the farm sheep business is found in internal parasites. The increase in size of flocks and additional new flocks will go on as the more timid onlookers receive confidence from the experience of more venturesome ones, who are venturesome because of not realizing fully what they have to contend with. In a great many cases in the Central States these newer flocks have proved sources of discouragement rather than encouragement. The cause of the inevitable result is found in parasites, the prevention and treatment of which is well understood in some sections, but not generally in country places. In fact, rural veterinary practitioners have very commonly admitted to sheep owners their inability to diagnose or treat what is to an experienced person readily recognized as stomach worm affections. The life history and the most successful methods of prevention and treatment were worked out several years ago by the pathological Division of the Bureau of Animal Industry, and are gradually coming into practice. However, as stated, in
most cases farmers, and in many cases practitioners, are not familiar with the results of this work and simply through such ignorance an important economical development, the live stock business is being retarded.

During the past year the extension veterinarians and sheep extension specialist in Indiana held two meetings for the purpose of familiarizing practitioners with the prevention and treatment of sheep ailments, and particularly parasites. In 1918, at the annual meeting of the New York State Veterinary Association, a number of special papers relating to sheep affections were presented, and the July, 1918, number of the Cornell Veterinarian was devoted entirely to diseases of sheep. Aside from these two activities very little has been done in a practical or well thought out way to overcome this great lack, which is really as important to the practitioners themselves as it is to their clients.

**Extended Organization for Control of Animal Health**

While much is to be hoped for through the broader training of country practitioners to include control of affections of cattle, sheep and swine, it is very doubtful in my own mind whether the kind of service above referred to can ever be secured in a complete degree through the general practitioner. Even with higher values of farm stock, farmers are generally not strongly inclined to call for professional assistance for individual sheep or hogs. Of course, this is due in large part to the fact that such professional aid as has been secured for these animals has not been so competent or so satisfactory as that available for horses.

I am going to make a suggestion as to a practical method of securing this closer supervision of animal health. I believe that the present organization and activities of the county farm bureaus indicate the lines of procedure for most thorough and permanent work in this line. Since I am connected neither with agricultural extension work nor with sanitary work I can speak wholly disinterestedly. I wish also to assure you that I am making this suggestion solely on my own responsibility. In fact, practically all of a number of persons in the Bureau of Animal Industry and outside of it with whom I talked over this matter advised me strongly against presenting any such plan. It is probably on account of having received such advice that I am venturing onto somewhat dangerous ground.

There has been some discussion and conflict as to the proper function of the county agricultural agents in matters relating
to animal health control. I take the ground that the county agricultural agent, if he is competent for his work, has not time to seriously engage in this kind of work. Those most conversant with the development and work of the county farm bureau organizations, however, consider that the logical outcome is the final establishment of an agricultural staff in each county. Such a staff would comprise a trained and qualified specialist for each of the major lines of production in that county. These specialists would work as a part of the county organization and presumably would be directly under the control of the farm bureau committee on matters of that kind. In fact a beginning in this system has been made by some of the Illinois farm organizations which have already employed veterinarians. In New York state a number of counties have employed trained plant pathologists for service within the county.

After the last outbreak of foot-and-mouth disease a plan was suggested and largely discussed, having for its main feature the creation of local committees to act as reporters of health conditions in their territories and to represent the state officials not in general control work to be carried out. The present large and thorough organization of county farm bureaus furnishes existing and active machinery for all local committees in connection with agricultural matters and further detailed organization to work down as low as even county units could not reasonably be expected to succeed if organized independently of these popular and effective bodies.

With trained sanitary specialists in counties having a large interest in live stock production, they would have ample educational and supervisory work to perform at all times and would be available and on the ground in case of emergency. One point at which these men could be used to do very effective work not now performed is that of tracing to their sources disease conditions reported from inspection at slaughtering points. With the conditions so reported traced back to their sources great service could be rendered to the owners of such stock and to the community.

Such officials, working as a part of the agricultural organization of the states, would not thereby come directly under control of the state sanitary officials. It is quite reasonable to expect, however, that practical and harmonious relations could be established between the sanitary and extension officials to insure the prompt transmission of reports and the execution of all necessary measures.
DR. FELKER: (New Hampshire.) I was interested in that part of Dr. Marshall's paper that related to the work of certain agents in certain areas which brings about a condition in our state that I would like to emphasize.

I would like to ask if the paper that he has read will be published verbatim, including all of the suggestions? I wish he might be permitted to add something relative to the influence of certain agents that are sent out by the Department of Agriculture, that have been in some cases in New England advising farmers in such a way that results have been bad.

I would like to point out one instance. One farmer lost $1,500 by following the advice of a man who was sent on from Washington with a chief expert, and before the state had knowledge of what was going on, before a qualified veterinarian, who I believe is the only man in any state who has a right to advise and counsel and take charge of these diseases and report them, took charge of the case that farmer had his entire flock wiped out.

I wish that Mr. Marshall might go even farther in relation to ill-advice on the part of incompetent men who presume or assume to be able to direct the efforts of live stock sanitary control for protection against diseases, although I do not want you to get the idea that I am condemning the County Farm Bureau organization, or the splendid work of the farm agents, so long as they keep within their proper sphere of action.

DR. MARSHALL: I don't know just what Commissioner Felker refers to. That is the first reference to anything of that kind that has ever come to my knowledge that might possibly be attributed to any of the men that have been working in co-operation with our Bureau in connection with the sheep protection work. I do not know who the official he refers to was, but I would like to make sure that everybody understands that it is hardly accurate to refer to the men that have been sent into the state by the Department of Agriculture. So far as the sheep protection work is concerned, I am sure I speak correctly when I say that all of the employes of the Department of Agriculture have been employed wholly in co-operation with and under the direction of the people within the state, and were always appointed upon consultation and advice, and usually upon nomination of the people of the state. If there have been some miscues, and there have been a lot of them during the war one way or the other, it has been unfortunate. We got some weak sisters in at that time, and this man in New Hampshire may have been one of them, but I will state that there is no one now engaged on this work in New Hampshire. This is the first complaint of any unfortunate result in that direction that I have heard.

One thing must be clear, so far as our Bureau is concerned, that it was immediately and mainly under the direction, control and supervision of the officials within the state.

CHAIRMAN ANDERSON: The next paper will be by Mr. George McKerrow of Wisconsin, on the sheep industry.

CHAIRMAN ANDERSON: In the absence of Mr. McKerrow, we will call for the next paper, Dr. Newsom, of the Colorado Experiment Station, on "Hemorrhagic Septicemia in Sheep."
HEMORRHAGIC SEPTICEMIA IN SHEEP

By I. E. Newsom, Colorado Experiment Station, Fort Collins, Colo.

The sheep industry in Colorado has assumed such importance in recent years that any considerable loss among these animals must be given due attention. Owing to the varied climatic and agricultural conditions within the state, its citizens have become extensively engaged in both the production and finishing of sheep for market. A very large proportion of the state can never be used for any other productive purpose than the grazing of live stock, and since sheep do remarkably well in our national forests the sheep raising industry will doubtless not only be continued, but will show a marked increase. The fertile valleys which may be irrigated from the mountain streams are fruitful sources of large quantities of alfalfa which can be fed to lambs with considerable profit. Consequently, these two industries have grown up in the state, side by side, but apparently at no recent time has the production of sheep been sufficient to fill the feed lots in the fall and winter. As a consequence, the feeding lambs are gathered to a large extent from other western states, notably Wyoming, Montana, Idaho, Utah, Arizona and New Mexico. There are fed within the state each year, an average of about a million and a half lambs which go in to the feeding pens during the months of October, November and December, and go out to eastern markets from three to five months later. Fully a million of these animals are fed in the Northern Colorado district, of which Ft. Collins may be said to be the center. Owing to our geographical location, we have, therefore, had the privilege of investigating a great many of the losses in the feeding lambs. For many years these losses proved to be an enigma, and while the investigations are still in progress and will doubtless continue for many years to come, we feel that we have made some slight advance in our knowledge of their cause. We have, therefore, come to the conclusion that a considerable percentage of our loss in feeding lambs may be properly said to be due to hemorrhagic septicemia. We make this assertion on the basis of the similarity of the symptoms and lesions to those described by other investigators, particularly Lignieres and Miessner and Schern; also on the frequent isolation of a bipolar organism with which we have been able to reproduce the condition in healthy animals. The investigations leading to this conclusion were given somewhat in detail at the Philadelphia meeting of the American Veterinary Medical Association, which report was published in the April and May
The losses in the feed lots will average about two per cent under ordinary circumstances. This includes losses from all causes and is commonly taken as the standard on which to figure results in the feeding industry. Naturally not all of these losses are due to hemorrhagic septicemia; some are due to bloating, crowding, possibly parasites, mechanical injuries, irregularities in diet, etc. However, the most of them can be directly attributed to hemorrhagic septicemia. It is very rare to have the disease take any extremely large percentage of the animals even though no treatment at all is administered. The most serious loss that we have recorded was the death of some 1,800 out of a band of 2,100, all within a few days. Generally speaking, the loss does not run above 10 per cent in any one band. It is very common to hear of losses of 50 to 150 head out of a thousand animals. In the range industry, the losses in ewes and lambs are sometimes quite severe, but even there seldom run over 10 per cent in the ewes and 20 per cent in suckling lambs. It will be apparent then that while the disease seldom wipes out whole flocks, it is so universally present that the aggregate loss is considerable.

As stated above, feed lot animals are more commonly affected within two or three weeks after arriving in the pens. Ewes are particularly susceptible at about lambing time and lambs during the first month of life.

The cause of the disease as given by most authorities is the bacterium ovisepticum, consequently if we call our disease hemorrhagic septicemia, it seems quite essential that we should find this organism in association with the malady in a large percentage of cases. This we have been able to do more consistently in the later outbreaks studied than in the earlier. While we frequently fail to demonstrate the organism in a particular case, we have not failed to find it in typical outbreaks where we have had access to several affected animals. It is true, of course, that the same organism may be demonstrated in healthy sheep and this we have been able to confirm, but we have not shown that
heart blood and spleen emulsions from healthy sheep would reveal the bipolar organism, although the lungs may in some instances. We have never been highly successful in isolating the organism directly from affected animals, but by the inoculation of rabbits, either intraperitoneally or intravenously, with tissue emulsions, we have been able to recover the organism in a large percentage of cases.

Smears made directly from the tissues of sheep dead of the disease, may or may not show a bipolar organism. In fact, we believe such smears to be negative in the large majority of cases. It is even true that rabbits inoculated intraperitoneally will frequently not show the organism in smears made from the heart blood, although it is probable that there are not more than 25 per cent of such cases. Even in these cases, smears made from the peritoneum will show their presence in large numbers. The fact that with pure cultures of these organisms, we can duplicate the symptoms and lesions found in the original cases, seems to give us strong evidence that the disease in reality is hemorrhagic septicemia and is due to the bipolar bacteria.

Predisposing Causes

That the bipolar bacterium is alone the cause of the trouble is of course not believed, as there are undoubtedly many conditions which render the animals peculiarly susceptible to the disease. In fact, we believe this so strongly that we are almost led to say that if these predisposing conditions could be controlled, the disease could be handled without the necessity of immunizing directly against the organism. Just what these predisposing causes are and why they operate, we are unable to say, but we are fully imbued with the idea that the exposure incident to shipping is a large factor. We are not at all sure that this exposure means an exposure to a virulent infection, since it seems possible to us that the organism may be normally resident in the animals and the lowering of the vitality causes it to assume virulence. On the other hand, there are instances which would indicate that the exposure to the infection is the chief factor.

In this connection, it may be well to give a specific instance which recently occurred. Forty-nine hundred lambs were gathered together in Montana, shipped to Denver, and there divided into three lots and all weighed and shipped out on the same day. One of the lots consisting of 2,300 came to Ft. Collins, where it was divided into two equal parts, one going about seven miles north and one about nine miles east. The other two lots con-
sisting of 1,600 and 1,000, respectively, were put into feed lots seven miles west of Ft. Collins and one mile south. Within about eight or ten days after arrival the sheep began to die in all of these bands, showing approximately the same symptoms and lesions, and from which we were able to isolate the bipolar organism. This would seem to indicate that the conditions which rendered the sheep susceptible were in operation while all of them were together—in other words, during shipping to Denver or at the Denver yards. It may further indicate that the period of incubation is about 8 or 10 days. On the other hand, we have in our records a case where several train loads of animals were gathered in the states north of us and shipped to Ft. Collins. One lot of 4,000 began to die within eight days after arrival, with a total loss of 225 within a week's time. The other sheep gathered at the same time and sent with this lot of 4,000 remained healthy, although having been separated from it on arrival at Ft. Collins.

The system of feeding may have a great deal to do with the susceptibility of the animals. There is a feeling on the part of some that high protein diet renders all animals susceptible to the bipolar organism. While it is true that our feeds are very high in protein, we have no definite data either for or against this supposition. We have no doubt that when the conditions are fully analyzed that methods of feeding and kinds of feed will be found to be a factor in predisposing to the disease. We have naturally thought that weather conditions were also a considerable factor, but there have been many happenings which would tend to shake our faith in this explanation. I have in mind one instance, where following a loss of about 80 head, the band consisting of 1,600 was vaccinated. That night and all the next day there was an extremely cold disagreeable rain, but in spite of this only four or five more animals were lost out of this flock. Animals came down with the disease without having been fed grain at all, so that we no longer attribute any considerable importance to the grain fed. It happens that the malady usually appears in the feed lots during the first two weeks after the arrival of the lambs, and it is of course during this time that the animals are being put on grain. This led to our earlier supposition that the grain feeding was a large factor in the causation of the disease.

Transmission

Whether the disease is actually transmitted from one animal to another, or whether the outbreaks appear owing to the
animals being placed under the same predisposing conditions, we are unable to state. In no case in our experimental work have any sheep come down with the disease from association with affected animals, although we have in a number of instances put presumably susceptible sheep in the pens with those which had been inoculated with virulent cultures. For some three years now, we have been destroying sheep in our experimental work with pure cultures of the organism, and we have repeatedly put in healthy sheep to see if they would contract the disease, but always with negative results. This is another reason why we presume that predisposing factors are of great importance. If the organisms are transmitted from one animal to another, and we have no doubt that they are, the opportunities for such transfer are of course excellent since sheep are always herded closely together and eat and drink out of the same troughs. We have been able to produce the disease only by the intravenous inoculation of the organism. We have given as high as 60 c.c. of a bouillon culture by mouth and 20 c.c. subcutaneously with negative results. We have not tried inhalation experiments.

Our observations do not confirm the belief, held by some, that the disease is transmitted to other species, since it is a very common practice to feed the dead sheep to hogs without any transference of the malady. Chickens also pick on the carcasses of animals dead of this disease without showing any subsequent symptoms of cholera.

**Symptoms**

In discussing symptoms and lesions, we find it necessary to differentiate between the acute and chronic types of the disease. In the acute type, the disease is often so rapid in its manifestations as to produce death before any symptoms are noticed. It is not uncommon for an owner to find dead in the morning from 5 to 10 head of lambs that were not known to be ill the night before. This type of disease almost always affects lambs that are otherwise strong and vigorous and in a good state of flesh. In fact, the owners frequently tell us that the disease is taking the very best of their animals. The sheep, however, are usually sick a few hours before death and if seen will be found with the ears drooped, head down, showing dullness and listlessness, not eating, and may have a slight drooling from the mouth and nose. The temperature at this time will run from 104 to near 108°. The highest temperature which we have ever taken being 107.8°. On examination of the axillary space or the in-
side of the thighs, it is sometimes possible in these acute cases to see hemorrhagic spots under the skin. The breathing may be somewhat labored and the heart may be beating more rapidly than usual. Lameness in one limb is also frequently noticed. Cerebral symptoms may sometimes manifest themselves, particularly in suckling lambs as evidenced by walking in a circle with the head turned to one side, but this symptom is more apt to be present in the chronic type.

In the chronic type of the malady the symptoms will vary according to the localization of the organism. We have been accustomed to describe pneumatic, enteric and cerebral forms. To this we should probably add also the nasal. It seems rather peculiar, but we seldom see much mixing of these forms; by this I mean that if we find the affection to be in the lungs of one animal, it usually runs as pneumonia throughout the band. Whereas, if the cerebral type is common, as it usually is in suckling lambs and in lambing ewes, there are seldom if any pneumatic lesions and not much intestinal disturbance. In some instances, we do find a mixture of these lesions but it is not the rule.

In the pulmonary form the respirations are audible and labored. The temperature usually runs from 102 to 105°. There is considerable dullness, loss of appetite, discharge from the nose, and rapid emaciation which latter symptom is common to all of the chronic cases. The disease runs from three to four days up to two or three weeks and usually results in death.

In the enteric form there may be a bloody diarrhea, with a normal or even subnormal temperature, extreme weakness in the latter stages, with death following in from three to seven days. Many of these cases, however, recover without treatment.

In the cerebral form walking in a circle is distinctive, with the head turned to one side, blindness, finally going down and becoming comatose. They may lie in this comatose state for as long as two weeks in some instances before death takes place.

For the sake of completeness, I shall describe the nasal form, but I have no definite knowledge that this is in reality a form of hemorrhagic septicemia. In this form there is a mucopurulent discharge from the nose, a matting of the wool around the eyes, some coughing and sneezing, temperature remains normal, but the disease is extremely chronic in character and seldom produces death. It may last for months, oftentimes with the
animals continuing in a good state of flesh. Usually, however, it is associated with emaciation.

Lesions

The lesions of course vary according to the type and to the form shown. In the acute type, the lesions are almost wholly hemorrhagic in character. These hemorrhages may be extremely numerous under the serous membranes throughout the body. This means that there may be subpleural, subpericardial, subperitoneal and frequently subcutaneous hemorrhages. On the other hand, animals may die of the acute type without showing any hemorrhages whatever, but this is rather the exception than the rule.

Quantities of straw-colored serum are frequently found in the pleural and pericardial cavities in this type. In some instances the fluid, particularly in the pericardial cavity, has coagulated. The mucous membrane of the trachea and larynx is deeply reddened. The blood frequently has a purplish hue. The whole of the fourth stomach and first portion of the duodenum may be deeply reddened as a result of hemorrhages into the wall. The lymph-glands are almost always much swollen and deeply reddened. Carcasses of animals dying with the acute type undergo postmortem decomposition very rapidly.

In the pulmonary form of the chronic type there is usually a fibrinous pleuritis with adhesions between the costal and pulmonary pleura. The lower portion of the apical and cardiac lobes is usually solidified. There may be circumscribed spots throughout the lung tissue, indicating that the disease started in isolated lobules. These spots are grayish in color and necrotic in character.

In the enteric form there is apt to be reddening of the mucous membrane of the fourth stomach, first portion of the duodenum, and in small areas throughout the intestines. Ulcers may also be present.

In the cerebral form, there may be no lesions whatever outside of the head. Occasionally, however, there will be a small pneumatic area in the lungs, the membranes surrounding the brain will be found to be congested and the mucous membrane of the nasal cavity and sinus is nearly always deeply reddened. In the nasal form there is swelling of the mucous membrane. The mucous membrane of the nose and sinuses may also be covered with mucous and pus.
There is one other lesion that is found in chronic cases, which may be associated with the pneumonic type or may appear separate from the other conditions. A recent case exhibiting this lesion may be of interest. A band consisting of 1,600 Colorado lambs was put on feed within 20 miles of where they were raised. Within a month, 30 head had been lost, largely exhibiting swelling of the joints with final paralysis of the hind legs. Examination of two or three revealed no other lesions than those of the joints of the limbs. A few days later as the disease increased in virulence on this place pneumonic lesions were found along with the joint lesions. Bipolar organisms were recovered from these animals. Ewes on the same place did not show disease. We have seen the joint affection in several of our inoculated animals that survived for ten days or longer. The pus within the joint was of a greenish hue and appeared to come from the serous membrane rather than the articular surface of the bone.

**Diagnosis**

The diagnosis of hemorrhagic septicemia offers a great deal of difficulty and in many cases there seems to be a question as to its accuracy. The symptoms and lesions are so varied that there is practically no symptom complex which is diagnostic. Too often practitioners diagnose hemorrhagic septicemia by the presence of petechial spots under the epicardium; whereas the fact is that petechial spots may be present under the epicardium in many other conditions and may be entirely absent in hemorrhagic septicemia. Smears made from the blood or tissues may reveal a bipolar organism, but it has been our experience that these organisms were not demonstrable in smears in more than 25 per cent of the cases. On the other hand, the mere presence of an occasional bipolar organism, particularly in the lungs, should not be considered as diagnostic. Still further the bacilli of the colon group give this peculiar bipolar staining in tissues, but to any one versed in the work, these organisms should not be mistaken for the pasteurella group because of their larger size. We feel that the recovery of the organism from rabbits which have been inoculated with heart, blood or spleen emulsion is fairly accurate as a diagnostic method, but we do not believe a negative diagnosis need be made if the results of rabbit inoculations are negative because in several typical outbreaks we have had positive and negative results running side by side. We very much hesitate to make a diagnosis from a small bottle of blood, or a small piece of tissue taken from any body.
organ. We, therefore, for diagnostic purposes prefer to receive the whole thoracic viscera, as well as the spleen, this to be sent to us in such condition as will prevent putrefaction.

The carcass of an animal that has not been dead more than an hour offers the best material for a postmortem examination. Slaughtered animals seldom reveal hemorrhages and in the acute type decomposition takes place so rapidly that all lesions are obscured within a few hours after death.

**Differential Diagnosis**

Other diseases from which hemorrhagic septicemia should be differentiated are gid, diseases associated with stomach worms, lung worms and estrus ovis, ictero-hematuria, anthrax and plant poisoning. The cerebral form of the disease may simulate gid and the presence of larvae of the sheep bot fly, but a careful postmortem will easily differentiate these. It is of course possible that hemorrhagic septicemia might exist in the same animal that was suffering from gid or from "grub in the head" but the size of the parasites in each case would assist in the differentiation. We have seen some cases where we felt that the larvae of the estrus ovis were doing considerable damage, particularly in the early spring. The presence of any considerable number of stomach worms or lung worms is quite significant and should receive due consideration. Lignieres had a feeling that stomach worms predisposed to hemorrhagic septicemia, but our experience has given us no cause to believe this. In fact stomach worms are rather rare in western sheep. When stomach worms were present in any considerable number, rabbit inoculation for hemorrhagic septicemia has been negative. Neither have there been very typical lesions of this disease. It does not seem necessary to differentiate hemorrhagic septicemia from pneumonia as it is our experience, as well as the belief of many other investigators, that most of the pneumonia of sheep is due to the bipolar organism, even though these cases be sporadic in nature. We have not found it necessary to differentiate between blackleg and hemorrhagic septicemia as we have not yet seen a case in sheep which we have diagnosed as blackleg.

We have seen three outbreaks of a disease which we have diagnosed ictero-hematuria, one in lambs and two in ewes. We made this diagnosis on the basis of the yellowish condition found throughout the body tissues and the presence of hemoglobin in the urine. We were not, however, able to demonstrate the protozoan which is presumed to cause this disease. Anthrax
can be easily differentiated by the finding of the organism, and also by the enlarged and dark spleen, and the black tarry blood which fails to coagulate. The plant that kills most sheep in Colorado is the milkweed, Asclepias galiioides.

**Treatment**

We know of no satisfactory treatment for sick animals, although many of the sick recover without treatment. It is always well to remove the animals to new quarters, when this can be done, give plenty of water, laxative diet such as bran and third cutting alfalfa, if this be available. Theoretically the serum which is now being produced should be administered, but our experience with it has been so limited that we are unable to make a statement as to its practicability. In valuable animals, however, it seems that it should be tried.

**Prevention**

Inasmuch as predisposing causes are such a factor, we are inclined to the belief that if they could be thoroughly controlled, the disease might be prevented without the use of any special immunizing agent, but since these are so little known, it seems necessary to apply other methods at present. Lignieres found the greatest value when he used a culture of a live organism for immunization purposes and the evidence collected in this country is in favor of that view. An organism killed by antiseptics is preferable to one killed by heat for this purpose. It seems probable that a live organism vaccine would be of most value if it could be produced under such conditions as to be applied when it is still alive. This would necessitate that the vaccine be made up a few days prior to its administration, which on a commercial scale is practically impossible. We feel that a live organism vaccine is quite safe if administered subcutaneously because in no case have we been able to destroy sheep by subcutaneous inoculation, although we have given as high as 20 c. c. of a bouillon culture at one time. It seems, therefore, that the best agent which has been devised and which is practicable is the organism which is killed by antiseptics. The question of dosage, while a very important one, has not been much studied, to our knowledge, and we do not know whether the dose should contain one million organisms or one hundred billion. A few experiments which we have conducted indicate that the dosage should be large, but they are naturally too few on which to base a conclusion. Our experiments were necessarily carried on with the administration of a live organism intravenously, as a
check to the value of the vaccine, and it is quite apparent that this does not duplicate the natural means of infection.

There has been much discussion as to the value of vaccine, inasmuch as the disease is so erratic that it often dies out without any treatment. It has not been possible in any of our work to vaccinate only half of an infected herd. We are, however, now engaged in vaccinating one-half of a number of herds for purely preventive purposes, there being no considerable loss in any of them. We are hoping at the end of the present feeding season to be able to have some data on which we can speak with assurance about this question. Many thousands of animals have been vaccinated during the past three years with generally satisfactory results. In a few instances vaccine seems to have had no effect whatever on the course of the disease. We recall that in one case vaccine was administered to a small band of sheep, five different times during a period of about two years and in spite of this, occasional losses occurred in this band. In another instance, in a band of 1,100, we waited for about a month for the animals to stop dying before administering vaccine. While they were not dying rapidly, an occasional one was lost so that at the end of a month there had been a loss of about 40. After the administration of vaccine there was no further loss for about ten days, when the losses continued as before treatment. While it never proved very serious, there was a loss of 22 head during the rest of the feeding season. The owner was dissatisfied and so were we. On the other hand, we have recorded an instance in which we waited from October 12 until November 10, approximately one month for the animals to stop dying, during which time there had been a loss of approximately 60 head, with about 40 sick. Following vaccination, four animals were lost during the rest of the feeding season. We feel that we have demonstrated experimentally that immunity can be had against the organism of hemorrhagic septicemia, and we feel further that the results in the field have been generally satisfactory. Consequently, we are advising its use in herds where the disease exists, being careful, however, to state to the owner in each case that in a few instances vaccination has not been satisfactory and that the disease may stop at any time without treatment.

In its erratic course, the disease differs in no way from the same malady in other animals, since we recall some instances where we advised vaccination in cattle after a rather heavy loss from what appeared to be this disease—in which our advice was not taken and in which the disease stopped as suddenly as it
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<td>Lambs</td>
<td>Owner satisfied</td>
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<td>56</td>
<td>2/21/19</td>
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had been begun. The disease in chickens and hogs runs very much the same course. It is of course difficult to say under such conditions whether any line of treatment has been of value, but if our investigations continue, we hope at some future time to be able to say with some definiteness that this procedure which is now so commonly used is or is not of real service.

Whether disinfection of cars, public yards, and feeding pens following an outbreak would have any influence on the disease, we do not know. We have not been accustomed to advise disinfection following outbreaks, and while the disease may be due to a particularly virulent type of organism picked up at some point in transit, we have rather leaned to the belief that the predisposing causes were a greater factor than the contact with the virulent bacillus. The fact which is now commonly reported that hemorrhagic septicemia in cattle was less prevalent during the time of the disinfection of yards and cars on account of foot-and-mouth disease is very significant, and if this means that virulent organisms were kept down, then the same results would probably be had with sheep. We feel that it is entirely too early to make recommendations on the regulatory side as these should preferably be based upon accurate investigation.

PRESIDENT DUNPHY: You have listened to a very interesting paper, and it is now open for discussion.

DR. KINSLEY: I have been much interested in Dr. Newsom's paper, but if I may be pardoned, I would like to read into the record another statement before discussing the one on hemorrhagic septicemia.

Yesterday in the session concerning hogs, and particularly stock hogs, the statement was made that it was unfair to the purchaser of the stock hogs on the rejects, since he was paid only the salvage on those hogs. In the Kansas City yards, I happen to know that all rejects are weighed back and the purchase price rebated, so that there is no loss, except that he does not get his full carload of hogs.

I have been very interested in Dr. Newsom's discussion of hemorrhagic septicemia in sheep. In our section of the country this disease is more or less interesting, and almost continually present. We find more of it in the fall, winter and spring; in other words, we find more hemorrhagic septicemia during the changeable season, and particularly the cold weather.

I do not know just what percentage of the flocks of sheep in our community have been visited by this plague, hemorrhagic septicemia, but I do know that during some years a large percentage of the sheep shipped out of the public markets for feeding purposes, have more or less hemorrhagic septicemia within three weeks after they are shipped out; and contrary perhaps somewhat to Dr. Newsom's statement, where such sheep are shipped into premises where native sheep abound, it is not uncommon that the disease occurs most virulently in the native sheep, the shipped-in sheep carry the infection, and probably within two weeks
from that the acute type of disease attacks those sheep. That is not at all uncommon in our section of the country.

Dr. Newsom has ably discussed the causes of hemorrhagic septicemia in sheep, and I wish to support his statement by saying that apparently in the beginning of this disease in sheep, probably, as in other animals, a predisposition seems necessary. What that predisposition is has not been determined, although apparently it is rather variable. As I have stated, shipping conditions form a very important predisposing factor. Whether or not that means that the sheep have picked up the infection in public yards or stock cars, I do not know, but anyway we find that shipping seems to be an important factor in the development of hemorrhagic septicemia in sheep.

We have some shippers that are of the opinion that dipping, particularly in the fall or early spring while the weather is quite likely to be changeable, is a very important predisposing factor; but unfortunately there are many shippers that object to dipping of apparently healthy sheep, and perhaps they are adding this statement to their already confirmed belief, to strengthen their objections; that is, they do not like the idea of dipping. I have personally not observed any difference in dipped sheep and sheep that were not dipped, so far as the occurrence of hemorrhagic septicemia is concerned.

I do believe, however, that after the hemorrhagic septicemia organism has gained virulence by passing through a like species of animals, that it might attack the others as indicated in the statement, and those sheep become affected with one of the types of this disease that he has observed, namely, acute or septicemic, pulmonary or enteric, and finally cerebral, which I believe is always acute.

We have had some reports, although I have not had the privilege of personally observing any cases of the so-called cutaneous type of hemorrhagic septicemia in sheep. The symptoms and lesions have been, I believe, fully enumerated by Dr. Newsom, and need not be repeated.

As to diagnosis, I want to ask Dr. Newsom relative to two conditions not uncommon. This is not questioning at all the diagnosis of hemorrhagic septicemia, but I believe it would do us all some good and no harm to have the information as to those two conditions. One of them is a pneumonia that is relatively common in western sheep, and particularly northwestern sheep that are shipped into our section of the country. This pneumonia is characterized by a solidifying of the lungs by calcareous deposits, and this type of pneumonia is not acute, but subacute, not chronic, and the nasal discharges contain gray matter. You can take hold of the nostril, remove a little of the discharge, rub it in your hands, and feel sand granules. This is a rather characteristic type of pneumonia that we have found in sheep from the west and the northwest, and personally I believe that we would all be benefited if the Doctor would give us just a little information about that pneumonia, and whether or not it has any relation to hemorrhagic septicemia.

Another condition that is quite common with hemorrhagic septicemia in our section of the country, is a diseased condition in which the ocular mucous membrane becomes infected, the condition being characterized first by a serous discharge, like lachrymation and mucou, and then there is infiltration of the entire head region.

Some of our practitioners call this condition big head, although I don't believe it is the same as the so-called big head in sheep that has
been described as especially occurring in the west. This condition occurs in sheep that are turned in stubble fields, or in corn fields, in the early fall. I do not believe that it is hemorrhagic septicemia in any sense of the word. It is frequently fatal in the animals are not removed from the surroundings in which they have obtained the causative agent, and quite a large number will die.

My idea is that this is some kind of a poison, and after the irritation has been established, various secondary effective agents gain entrance and cause considerable trouble.

The Doctor mentioned in treatment the use of the live organisms. It appeals to me that it is very poor sanitation to use a live organism of this type that we do not know how readily, and how rapidly will regain its virulence. If the Doctor has some means of knowing, or knows that these organisms can be attenuated in such a way that they will not likely regain virulence, then perhaps it would be all right to make use of a living organism, otherwise it seems to me bad sanitary practice to introduce these live organisms into bands of sheep.

The Doctor also spoke of the fact that he was not familiar with the disinfection as to control. I am not familiar with how much disinfection will prevent hemorrhagic septicemia in sheep, but I do know that two or three years ago after the appearance of stomatitis in the Kansas City yards, they were cleaned and disinfected, and hemorrhagic septicemia in calves dropped practically to nothing, and preceding that a large percentage of the shipments, particularly of calves, developed hemorrhagic septicemia, and the reduction of this disease incidental to the disinfection of the yards was very noticeable.

You all know I am from Missouri and I would like to just throw in a little of the goat with the sheep. I believe the goat is affected with hemorrhagic septicemia just the same as the sheep, and the organism seems to be transmitted in these two animals very readily; in fact, I have seen bands of goats and sheep intermingled, in which the disease existed in both, and I doubt if there was a separate variety of organism infecting the two, so I believe that the goat should receive some consideration. So far as I know, the disease is manifested in goats, and can be produced in goats about the same as in sheep.

I have seen two different instances in which hemorrhagic septicemia was a factor in goats, though in goats, as probably in sheep, there are other conditions that concur, and are commonly diagnosed as hemorrhagic septicemia that are not that disease at all.

The parasite question in these animals is a very important one. We have previously had a discussion of that, although we have heard here this morning that our experts in that line, and I do not believe it would do any harm to know whether or not there have been any new ideas revealed concerning the control of stomach worms in sheep. They are a mighty important factor in our section of the country. Also in some parts of our country, perhaps more of the southwest, tapeworms are coming to be quite a factor in sheep and in goats.

DR. BUTLER: (Montana) At this time of the year in the western states we have a disease or condition that simulates hemorrhagic septicemia in both cattle or sheep. For example, take cattle off of short grass and put them down into an alfalfa stubble field, and they develop a bloody diarrhea. We have not been able to isolate definitely the bipolar organism of hemorrhagic septicemia in these cases. We have
isolated bipolar bacilli in some cases, but it did not satisfy us that the
condition was hemorrhagic septicemia.

We are able to prevent that trouble by giving our cattle upland hay
or a first cutting of alfalfa, and gradually onto the stubble field, or
gradually onto beet pulp, and we avoid this condition.

Some fifteen years ago I remember a man shipped a trainload of
horses from some place in Idaho to Dixon, North Dakota. They were
watered at Helena, and between Helena and Glendive, which is about
a 300-mile run, 200 head died.

Take any animal from the ranch country that has been off of water
and food for twenty-four to thirty-six hours, give them plenty of water,
and you will get this condition. This can be avoided by first treating
them before watering them. That may sound funny to you, but we
know what happens.

With reference to the bipolar bacillus, some years ago you probably
remember, in Utah and also in northern California, ducks died by the
ten thousands. Some ducks were shipped to us, and from the heart
blood and the lung some bipolar bacilli were isolated. We thought
probably the condition was due to bipolar infection. We are satisfied
now that it was not, but that the bipolar bacillus can be isolated in
almost any animal found dead, or which you destroy, and the presence
of the bipolar bacilli is not satisfactory evidence that the hemorrhagic
septicemia was the fundamental cause of death.

DR. ANDERSON: I would like to ask if there is anyone present that
has observed in sheep the peculiar characteristics seen in cattle, some-
times described as mad itch? Dr. Newsom I believe did not mention
that. I would also like to ask whether anyone is present who can tell
us how long immunity will last, immunization with bacterin in hemor-
rhagic septicemia?

PRESIDENT DUNPHY: Will somebody please answer Dr. Anderson’s
question? I think it is an important question. Dr. Newsom, can you
answer this question?

DR. NEWSOM: First I will answer the questions asked by Dr. Kinsley
insofar as I am able. Dr. Kinsley asked about calcification, in which
calcium granules are found in the nasal discharges. I have not seen
this condition, and consequently I am unable to tell him anything about
it. He evidently knows a great deal more about it than I do. We fre-
quently have discharges from the eyes, associated with discharges from
the nose, in what I described as nasal hemorrhagic septicemia. I told
you that I had no definite knowledge that it was septicemia. I
merely included it because some of our authors have done so. I have
done no work with that particular type, if it be a type of hemorrhagic
septicemia.

Relative to the live organism vaccine, I did not urge the use of a
live organism vaccine. I did say that I believe it would be preferable
insofar as the immunity to be had was concerned, but I do not see how
we can overcome the practical difficulty in its use, consequently I am
not urging a live organism vaccine at the present time.

In regard to Dr. Anderson’s query, I have not seen the condition in
sheep which simulates mad itch in cattle. Apparently it does not occur
in sheep. I do not know how long the immunity will last. We have
the reports of some investigators, and some tell us it will last three
months, others that it will last six weeks. I have made no determination of that point.

DR. RANSOM: The question of parasites was raised. That subject is hardly germane to the paper under discussion, and I have no intention of discussing it at length, but I simply want to call attention to the fact that the Department of Agriculture has recently issued a circular which deals with stomach worm diseases of sheep. It is Departmental Circular 47, containing a fairly complete description, from the popular standpoint, of stomach worm disease, its treatment and control.

With reference to tapeworms, as yet there seems to be no easy certain method of their treatment or control. We know nothing of the life history of tapeworms, and the efforts to define economic treatment have thus far proved fruitless. In some cases the copper sulphate treatment recommended for stomach worms will expel tapeworms, but not with the same regularity, or with the same completeness that it expels or destroys stomach worms.

DR. WRIGHT (Wisconsin): I want to substantiate what Dr. Newsom has said. I believe that the influence of feed on sheep does not play a very important part in causing hemorrhagic septicemia. In an experience of fifteen years with from five to ten thousand feeding lambs under my observation, I have never recognized the disease of hemorrhagic septicemia until this year. During all this period the sheep have been fed almost everything, from ground screenings to salvaged oats, ground peas, with pea ensilage as roughage. I may have overlooked it, but in that period I have never recognized hemorrhagic septicemia until a week ago when we had an outbreak following dipping. Sheep were dipped about ten days prior to the first outbreak, and we lost about fifty lambs in a week.

Also I want to substantiate what Dr. Newsom said about western sheep being free from internal parasites. Until last season we never found internal parasites in western sheep. This was a tapeworm about nine inches long which caused the death of fifteen lambs that I posted from inflammation of the bile duct. That is the only parasite of any kind that I have ever found in western sheep.

DR. DAY: I have been somewhat interested in this discussion on hemorrhagic septicemia in sheep, and if I understood Dr. Newsom right, I got the idea that practically all cases that appear to be pneumonia are hemorrhagic septicemia.

Also Dr. Kinsley made the remark that when hemorrhagic septicemia was introduced into native flocks by sheep that were shipped from the west, the native animals suffered most.

It has been my province to look up a number of shipments where sheep have been dying for several years past, and I must say that I do not agree with Dr. Kinsley, provided that Dr. Newsom's statement is correct. If practically all cases, or a large number of these cases that show pneumatic lesions are hemorrhagic septicemia, I have never seen native animals die from such lesions. Usually where a number of sheep have been dipped and shipped for some considerable distance across the country, some probably will be sick when they are unloaded at destination, still others will die. In some instances the loss is quite heavy, in others light, but I have seen nothing to indicate that pneumonia was spread to any of the native animals, although they have mingled together. Whether this could be hemorrhagic septicemia or not, I am not able to
say, but I am frank to say that I have never been able to prove that it was. It appeared to me that in many instances pneumonia was probably due to exposure on the train, after the sheep had been dipped. Their fleeces were more or less wet, and many times the records show that there has been very bad shipping weather, cold, rain, etc.

These are questions that seem rather important to me and I think to most every one, and I would like to hear some more discussion, because I would like to get some light on this point.

Another shipment that I investigated consisted of a double-decked carload of sheep, the symptoms shown being very much like Dr. Kinsley described. The man moved the sheep to every field on his farm, but he lost all of his double-decked carload, with the exception of fourteen. I found no indication of bipolar organisms. I made some inoculations but got no results.

Dr. Kinsley: Perhaps I made a wrong statement, or was misunderstood relative to the native sheep. I did not state, or I should not, that in every instance of shipment of sheep on farms where there were native sheep that they transmitted the disease to the sheep, and I certainly should not consider that when native sheep become infected with the septicemic type of disease, that it is due to that fact.

I was glad to hear of the experiences that others have had, and I would like to hear from Dr. W. J. Butler, relative to pneumonia in sheep in the northwest.

Dr. Butler: I used cattle, and I might have said sheep, and I will use sheep now. In the Billings district, and the Yellowstone Valley, we found that the feeders fed there something over 500,000 sheep, and quite a few sheep had hemorrhagic septicemia. We found that by changing the method of feeding in accordance with what I stated before, we remedied that condition, and we have found hemorrhagica, or the bipolar organism, in pretty nearly every case that we tested. It can always be found in the feces. In examining these animals we found that we were right in thinking that they did not die of hemorrhagic septicemia. This bipolar organism was the cause of death, but it was secondary. There was a primary condition such as Dr. Newsom spoke about, and we believe that you can prevent this by proper feeding. I do not mean that a protein diet will cause symptoms of hemorrhagic septicemia, but I mean that if there is a sudden change of feeding combined with exposure, it will cause this condition and simulate hemorrhagic septicemia, and it really is not hemorrhagic septicemia, but is due to the quick change, or radical change of feeding.

There is a condition in the northwest that has been described by Dr. Newsom as progressive edematous pneumonia. We find it in our sheep. The sheep men call them lungers. You go through the northwest and if two sheeplemen meet, one will say to the other: "Have you any lungers?" It generally occurs in old sheep. We have not been able to isolate any organism that would cause this particular condition. It is apparently not infectious or contagious. It occurs principally in the winter months, generally in old sheep. It is simply progressive edematous pneumonia. The animal is found sick, wheezing and breathing fast. I have never known the condition to appear in a lamb; in fact, with probably one or two exceptions, I have never seen it in a sheep under three years of age.
An animal is feeding on alfalfa. It lags a little bit and the owner or the herder culls it out. It is a lunger and it gradually wastes away, and will die in from 30 to 60 or 90 days. They seldom live over 90 days. All the postmortems show the same condition—a progressive edematous form of lobular pneumonia—no other symptoms, no other pathological changes in the body that we have ever been able to demonstrate.

We have not been able to transmit it from one animal to another through inoculation, but it is a bad condition, and in certain sections causes a loss of approximately five per cent.

Dr. Haslam: I have made some observations on hemorrhagic septicemia in rabbits. It usually occurs in the acute septicemic types. The organism is easily isolated, and in my experience it has been almost always the result of being kept on cold cement floors. If rabbits are not taken off cement floors in the fall they are almost sure to contract hemorrhagic septicemia.

Dr. C. C. Mills: I would like to ask Dr. Newson to tell us about the hemorrhagic septicemia germ being found in sheep that were not diseased. Have you tried any experiments in testing these germs in the inoculation of rabbits?

President Dunphy: Are there any other questions that anyone wishes to put to Dr. Newsom, if so, please manifest it and he will answer all these questions at once.

Dr. Lockett: We have a condition that sometimes occurs in cornfields—the sheep have nasal discharge, and more or less swelling of the head.

In Nevada on one occasion we had a band that was poisoned; about 1,300 died within six days. We believed that if we could determine what had caused this condition, we would also know what caused big-head or swelled head in sheep. We had very little difficulty in determining the actual cause of this condition.

The sheep had been unloaded from the train, and taken into a canyon, and there the trouble originated. The plant on which these sheep fed is a variety of tetradium. Some of the sheep showed typical symptoms of big head or swelled head, and we conducted some feeding experiments with this plant, the sheep dying with symptoms more or less like those formerly described. Further investigation showed that the poisoning was due to the fact that the sheep were rather hungry when unloaded and they fell upon the grasses, or whatever herbage was handy, and was full of tetradium.

So far as we have been able to discover from the work that has been done on it, a small portion of this plant, or rations of this plant do not seriously affect sheep, but if fed large amounts they all show the same symptoms to a greater or less extent. Some show symptoms of big head, others weakness continuing to death. An analysis of the plant has so far not disclosed any specific alkaloid or glucoid that could be incriminating. But an analysis of the plant shows that like a great many desert plants of this type which have not been bleached by rain or moisture the content of potash is very high.

Dr. Newsom: First, relative to Dr. Day's question, if he has been dealing with the same kind of pneumonia that we have had, I believe that inoculation of rabbits would be pneumonic, that is, the solidified
portions of the lung, or even of the spleen in many cases will give the bipolar organism.

In regard to pneumonia, no human practitioner thinks of pneumonia as being caused by exposure; he figures that while exposure may be a considerable factor, the actual cause of the lesion is in most instances some bacteria, whether it be pneumatic or streptococcic.

Dr. Butler, you notice, has laid a great deal of stress on these predisposing factors, and I did hope that the gentleman would not make us believe that the predisposing factors alone cause the condition, because I very seriously doubt that they would if the organisms were not present.

It is true that if we knew the predisposing factor of hemorrhagic septicemia, their presence would be evidence of that disease. It is also true that if we could control the predisposing factor in pneumonia in man, I believe we would not have the disease, but I think we should take the two together. We are well aware that the predisposing factors in tuberculosis in man are the all-important conditions of living, and food and air are very important, and yet that does not cause us to believe that the tuberculosis bacillus has nothing to do with the disease.

Answering the gentleman's question here, our work of determining the presence of those organisms in normal animals was done by inoculation, otherwise we would not have found the active organisms, so I will say that there are organisms in normal animals that are pathogenic to rabbits; in fact, it ran as high as 40 per cent in some instances.

PRESIDENT DUNPHY: Is there any further discussion? If not, I will ask if Mr. George McKerrow is present. He has written the Secretary that he would be present at this meeting and talk to us on the sheep industry, as this was to be a sheep session.

Dr. Eichhorn has been disappointed in getting the necessary data for his paper from the authorities of the various states, and asks that his paper go over until next year, when he hopes to have all the necessary data at hand. I think under the circumstances Dr. Eichhorn is quite excusable.

There are some applications in, and there will be no other chance to submit them to the Executive Committee unless they are reported and acted upon at this time.

(See list of applications elsewhere in the report.)

The convention adjourned until two o'clock P. M.

SIXTH SESSION.

December 3, 1919, 2:00 P. M.

The meeting was called to order by Vice-President L. H. Eliason.

CHAIRMAN ELIASON: The first paper on the program is: "Sanitation and Livestock Transportation," by A. F. Stryker, Secretary and Traffic Manager of the Omaha Live Stock Exchange.

SANITATION AND LIVE STOCK TRANSPORTATION

By A. F. Stryker, Omaha.

My subject, if treated fairly, will necessitate some rather plain talking on my part, because those whom I represent on the Mis-
U. S. LIVE STOCK ASSOCIATION

souri River, particularly those of my people at Omaha, are now and have always been strongly in favor of the eradication of live stock diseases, their prevention wherever possible, and do not under any circumstances desire to be classed with those obstructionists who always oppose advancement, in no matter what line proposed. Sanitation is synonymous with cleanliness. Cleanliness, being next to Godliness, we naturally would be in favor of it. And yet it sometimes occurs to us that the price we are asked to pay is too high.

I want it distinctly understood that in any criticisms I shall make of present regulations there are absolutely no personalities. It may be that I shall take decided exception to certain rules and regulations, but that does not mean that I have anything personal in my heart with relation to the members of the particular boards whose rulings I am criticising. It should also be understood that I realize it is easy to tear down, difficult to build up, and that in criticising, a critic should be constructive. That shall be my aim.

Some of you know my opinions on some of the sanitary rules which have been enacted by the federal government and the several states within the past year or two relative to live stock transportation. That we may get off on the right foot, and that there may be no misunderstandings, I want to say first that I am heartily in favor of uniform sanitary laws, promulgated by the Bureau of Animal Industry, if you please, which will cover interstate movements of live stock, no matter where made, in the United States. We are opposed to one law between Illinois and Iowa, another between Iowa and Minnesota, a third between South Dakota and Nebraska, and as many different changes as there are different combinations of states. It is our belief that one law covering movements of live stock for the whole country should suffice.

I think, in order to intelligently handle this subject, it ought to be divided into different parts, and with your permission I shall so divide it:

First, I want to take up B. A. T. Order No. 263, Regulation No. 7. It shall not be my purpose to discuss regulations relative to the handling of pure-bred or dairy live stock. We are heartily in accord with the government and the states in their endeavors to eradicate tuberculosis and other diseases from our pure-bred and dairy herds. My thoughts in this paper will be altogether in connection with the transportation of meat food animals and by no means do I intend to suggest that all neces-
sary efforts to eradicate diseases in this class of animals be neglected.

In Section 3, Paragraphs A, B, and C, we think the whole problem might be simplified by saying cows and bulls for feeding or grazing purposes may be shipped on affidavit of owner or shipper that they are being shipped for that purpose only, with a penalty for the violation of this declaration.

Our people can find no possible fault with the regulations requiring that all live stock shall move on B. A. I. certificates of health. This safeguard, in my judgment, is sufficient.

Next, I desire to discuss an order formulated by the Iowa Sanitary Board which requires that all live stock moved into the state of Iowa for feeding purposes shall be transported only in cleaned and disinfected cars. I wonder if any of you realize how much this regulation has hampered the movement of live stock to Iowa points this year. I wonder if the Iowa Board realizes that the Bureau of Animal Industry has been very careful in its scrutiny of stock cars, very careful to require the cleaning and disinfecting of any and all cars which have carried diseased animals to public markets, where most of the live stock finally lands, and that the necessity for an order of this kind is very slight. Delays of days at a time have occurred at public markets on live stock destined to Iowa this year where the stock was absolutely healthy, no disease of any kind being found in the stock, but yet the shipment had to wait until some carrier could clean and disinfect a car which was, in all likelihood, absolutely non-infected with any disease.

This is not entirely a selfish complaint on our part. Hundreds of Iowa shippers have bitterly complained, and have said to me personally that their feeding operations this fall and winter have been materially hampered and reduced in volume on account of this and other restrictions thrown around the movement of their live stock to feed lots.

Most of the states tributary to the markets on the Missouri River have required that all feeding sheep be dipped either at point of origin or at the feeding point. This dipping proposition is not an unmixed evil. I can readily understand why scabby sheep must be dipped. I can understand when if first-class attention may be given sheep after they are dipped, and weather conditions are not too severe, no direct harm may result. I am positive, however, that the enforcement of dipping orders has been the direct cause of the loss of thousands and thousands of feeder lambs this fall and winter. I realize that
during the war much scab was discovered in the feed lots of the corn belt; this scab was directly traceable in some instances to home ranges of the west. In my judgment this was because of the fact that the Bureau of Animal Industry had to use many of their valuable field men in war activities, taking them away from their stations on the range, where in times past they kept a close guard on the physical condition of sheep on the ranges. I believe in this particular case we have locked the barn door after the horse has been stolen. Bureau of Animal Industry employes are now back in their old stations on the ranges, in the producing territory. They are compelling owners of dirty sheep to clean up, and there is much less scab reaching our public markets than formerly. This condition is going to improve next year. Therefore, in my judgment, I believe we may safely trust the Bureau of Animal Industry to guard the interests of the sheep feeder and the states in this respect. The effect of the ordinarily accepted dips on young lambs is particularly disastrous. I have many specific instances of a serious death loss directly traceable to the dip. This, mind you, on perfectly clean lambs and dipped only because of the positive orders of numerous states. Sheep dipped in severe winter weather are, in my judgment, very likely to contract pneumonia. I do like the idea of the carrier preventing the loading of wet dipped sheep. I believe that they should be allowed to at least partially dry before being carried. Some of the best feeders in the corn belt advise me that the dipping of young lambs where they cannot be immediately properly fed, watered, and cared for, knocks them out for two or three weeks. This naturally discourages the feeder and has a tendency to lessen feeding operations. This year particularly, on account of the drought on the ranges, lambs have been marketed in a very thin and weak condition and have felt the effects of dipping more than ordinarily. I know of some instances where portions of bands of sheep have been dipped, other portions have been sent out without dipping, the dipped sheep had the scab and the undipped sheep did not—draw your own conclusions. One feeder I have in mind, who lives at Shelton, Nebraska, dipped all of his sheep for seven years, did not dip them for eight years, and had much more scab while dipping them than during the time he did not dip. This shipper tells me that by carefully watching his feeding sheep he can positively keep down any scab which may appear by hand treatment. In my judgment the dipping of sheep should be done on the range where the animals are surrounded by natural conditions, and before they
each the market. The death loss with a good many of our feeders this past fall has been 4 or 5 per cent on dipped sheep and 1 per cent on the undipped sheep. I want to call your attention to a clipping taken from the Chicago Daily Drovers' Journal of Friday, November 21, which calls attention to a letter sent to Dr. A. T. Peters, state veterinarian of Illinois, requesting that dipping be discontinued during the cold weather. We join in that request to those of you who have charge of the sanitary regulations of your several states.

I desire to call specific attention at this point to an order of the Bureau of Animal Industry law which makes it necessary that reactor animals be shipped to market in a car by themselves, or with other live stock which must be sold for immediate slaughter, while on the same train pure animals from into that state accompany the waybill for the shipments from herds which have contained reactors, may move in an unrestricted way to any destination. I think you will readily see the point. I believe thoroughly in the testing of dairy cattle and pure-bred cattle, but I am not inclined to feel that any great risk is run in allowing these animals to be moved to market in cars with other live stock which may be disposed of as best suits the owner or his agent.

Iowa at this time is requiring that permits to ship stock hogs into that state accompany the waybill for the shipments from point of origin. Iowa evidently does not trust her Uncle Samuel to see that these hogs are healthy when shipped. Hundreds of cars of stock hogs are purchased by feeders' representatives located at the public markets by wire wherever they can be secured in the country. I have in mind numerous shipments of hogs from Idaho to Iowa, purchased by wire. Do you realize the delay and inconvenience if, after these hogs are purchased, the shipper must wait for Iowa to send a permit to the shipping point? Why may not the certificate of the Bureau of Animal Industry Inspector be sufficient to move these hogs? This rule, if rigidly enforced by our Iowa friends, is going to materially curtail the movement of feeder hogs to Iowa, and to that extent reduce production. Our judgment is that stock hogs might much better go to the feed lots from the country than be shipped thereto from public markets. I surely cannot be accused of being selfish in the light of that statement. This matter has been taken up with Dr. Wall of the Iowa Sanitary Board; and I hope he can see his way clear in the near future to modify his order.
At this point I desire to reiterate the suggestion that so far as sanitary regulations are concerned, all state lines should be obliterated. Let us have a uniform, centralized control. This plan works well under corporate control of the railroads and it is with pleasure we hear that the carriers are soon to be again given control of their properties. It works well during epidemics, such as foot-and-mouth disease. It will work equally well in handling live stock movements.

During the past year a campaign was put on at the Omaha market to have all railroads clean their stock cars, not clean and disinfect, just clean. If a car came to the Omaha market in a dirty condition it was carded, "DO NOT SET FOR RELOADING TO THE UNION STOCK YARDS, OMAHA, NEBRASKA, WITHOUT CLEANING." The results of this work have been almost miraculous. Death losses in hogs consigned to our market have been so reduced as to be almost negligible. I want to give you a few figures on this point:

During the month of June, 1919, there were 209 uncleaned cars placarded, from which were taken 345 dead hogs. There was a total deadage in cleaned cars of 261 hogs out of a total of 4,081 cars, or a deadage per car of .06. The deadage per car in the uncleaned cars was 1.60, or a total deadage per car of .14 of 1 per cent. During that month we had about 300,000 hogs, with a deadage of about 2.01 hogs per thousand head. It might interest you to know that there is a higher percentage of deadage in motor-truck hogs than in hogs handled on railroads. The figures are about the same for July and August. Sanitation has done the business so far as deadage is concerned on our market. Oftentimes now we unload 100 or 150 cars of hogs and have 1 or 2 or 3 deads. Sanitation is well worth while.

This campaign in itself should make unnecessary Iowa's cleaning and disinfecting order on feeder shipments. May I suggest, please, that you gentlemen have a duty to perform along this line in your several localities?

I now come to that part of my talk which is of most vital interest to those of us at the Missouri River markets, and to the feeders of Iowa. This matter is a local one, I realize, but is of such importance to us that we feel it should be discussed. I refer to the orders of the Iowa Sanitary Board relative to the feeding of female cattle in that state. They require that all feeding female cattle be isolated on the premises of the feeder—this regardless of the fact that this female stock comes to them.
from other states under B. A. I. certificates of health. Also regardless of the fact that the B. A. I. does not construe their Regulation No. 7 as contemplating isolation. This regulation of the Iowa Sanitary Board has lessened feeding operations in Iowa to a great extent, has caused thousands to be prematurely slaughtered, has lessened the supply of food, has caused serious loss to its citizens and does not tend to eradicate disease to an appreciable extent. Quoting from the B. A. I. interpretation of Regulation No. 7 we find:

The interpretation of this quarantine is not that they should necessarily have to be maintained on the premises separate from all other cattle, but that they should be held on the premises of the feeder in order that they cannot possibly be distributed for dairy or breeding purposes.

Dr. Wall has told me on several occasions that the cause of the order, and others of a like character, is the action of unscrupulous dealers and feeders in peddling or auctioning milch or breeding cows which have been shipped to Iowa as feeders. This is a feature which should be handled by the Courts, and all of the feeders of Iowa should not be penalized on account of the actions of a few rascals. I want to promise, or guarantee, at this time, that those of us at the public markets on the Missouri River will see to it that none of our people do a trick of this character the second time.

I want at this time to quote from the law which creates the present Iowa Sanitary Board, and show that in absolute terms it says that the movements of feeder cattle to Iowa shall not be restricted or hampered in any way:

Section 1. That it shall be the duty of the Commission of Animal Health to protect the health of the domestic animals of the state; to determine and employ the most efficient and practical means for the prevention, suppression, control and eradication of dangerous, contagious or infectious diseases among the domestic animals."

Section 10. Provided, however, that no provision of this act pertaining to tuberculosis shall be applicable to cattle to be kept or sold for feeding purposes only, nor to transportation of same."

I have on my desk at home hundreds and hundreds of complaints concerning this drastic order. May I not prevail upon you to use your good offices with your associate, Dr. Wall, to the end that he may get in line with Missouri, Kansas, Illinois, Wisconsin, and other corn-producing states? Why should it be necessary for Iowa to be stricter than Illinois or Missouri? What is there about our sister state which should cause her sanitary officials to be so overzealous?
May I suggest, please, that your organizations in the several states may do a world of good along live stock transportation and sanitation lines by impressing upon your people the economical and sanitary reasons for loading in clean cars only, for refusing to accept dirty cars for hogs or sheep loading, by refusing to accept smooth-floored cars for cattle loading, by suggesting to them that during the summer great care should be exercised in cooling cars and hogs before same are moved, and in other efforts, not equally sanitary, but yet pertaining to the safe moving of live stock?

May I not also suggest your co-operation with the B. A. I. to the end that more simple and expeditious methods be adopted in the testing for tuberculosis of female live stock at our public markets? You know a goodly portion of the female stock which goes to the country is tested for tuberculosis for the reason that the owner wants to feel perfectly free to dispose of an animal now and then for dairy purposes, or to breed her. In my judgment, the time consumed in this operation might be reduced by at least one day. Will you not help us along this line?

Those of us at the Missouri River markets want to thank Kansas, Missouri, Illinois, and those other states for their co-operation with us along safe, sane and non-discriminatory lines in handling live stock between our several locations. We want to commend to South Dakota, if state lines may not be abolished, a little more careful scrutiny of her veterinarians, to the end that they may be just a little more careful in the handling of interstate shipments. I fear on numerous occasions their examinations have been more for the purpose of securing a fee than any other reason.

Representing a public market, we want to work with you gentlemen. We must work with you if the best possible results are to be obtained. We want to work with you, and we want to work with all of the states tributary to our territory, and we want you to work with us. Your interests and ours are mutual. Those things which damage the Iowa shipper, hurt us. We cannot get along without you. You cannot get along without the markets. Let us work together, developing and helping each other.

Dr. Luckey: I am mighty glad that representatives of the commission men and the public markets show a disposition to co-operate in securing results with a view of possible quarantine restrictions.

The handling of stock cattle out of public markets is today quite a problem; in fact, so far as federal regulation goes, the bars are more
or less down. If a man up to this time wanted to be a little tricky, he could go and buy a carload of grade Holsteins, or Jerseys, all tuberculars, for that matter, make an affidavit, apply for a shipment permit of stock cattle, and take the cattle to the country without any tuberculin test.

Where the commission men come in on this co-operation is simply this. A large percentage of the farmers who want to go to the market and buy a carload of cows for breeding purposes for themselves or some dairy cows to sell and scatter, do not really understand that there is great danger of spreading tuberculosis. If the live stock commission men could impress these men that it is really dangerous, that it is actually dangerous to their community to take a certain type of cattle out to the country and sell and scatter them, that would help a lot in securing a plan with a spirit of regulation which could further be made much more lenient. It is not only through ignorance that the farmer resents having his cattle tested at yards. We find a farmer now and then who boasts that he can go there and apply for a stock cattle permit and get it. Recently a buyer went into the Kansas City market, and applied for a shipping permit on two cars of steers; and shipped one car of steers and one of cows, and at destination he sold the cows.

Just a few days ago such a prominent firm as Clay, Robinson & Company of Kansas City, sent up their girl to get a stock cattle permit, and a little argument occurred. We insisted upon bringing the buyer up, and sent for his papers. Finally the buyer came up and we said: "What are you going to do with these cattle?" He was going to sell them; and he was willing to make any kind of an affidavit, or get any kind of a permit, and ship those cattle to the country and sell and scatter them, regardless of the regulation, defeating the purpose of the regulation.

There is a great chance for the markets, particularly in inspections for tuberculosis and in some other inspections, to develop public sentiment in favor of just such simple regulations as are necessary, but we find speculators and commission men attempting to evade, hence the regulations must be made that much harsher in order to prevent the spread of tuberculosis.

DR. BURNETT: Since July 1st, when the regulation went into effect, it has required no stretch of imagination to be aware of the fact that Ohio is a grazing state. Animals have been coming in on every train with grazing certificates, and it has taken a good many of our veterinarians to run them down. In many cases we find that Holstein cattle come into dairy districts, and before the cattle get there, it is advertised that so many milk cows will be sold on a certain date. We have been diligently running them down and it has taken a lot of our time and a lot of money that we should be devoting to other things.

These certificates state that the cattle cannot be taken into a state where they have no quarantine regulations. We are in duty bound to quarantine those cattle. We have a regulation that when a man buys a cattle at Kansas City or any other place and brings them into Ohio, we can quarantine them. He is angry about it. Yet he has a certificate that states that they cannot go into any state except states that have quarantine laws. In Ohio we are testing them, and we are going to continue to do so.
MR. STRYKER: I hardly think you have got my meaning. We do not object to quarantine so much, we object to isolation, and I have tried to explain the government definition of quarantine, that it did not mean isolation, but allowed the man to keep the stuff quarantined on his place. That is what we object to, isolation, not quarantine.

DR. BURNETT: Yes; but most of the cases that are coming to our state, they are not isolated, because the man that gets the cattle has no place. He peddles them around to 25 or 30 different people, and then if we have to test them, it takes our whole force to visit these 25 or 30 different places, because we cannot get to them many times until after the sale.

MR. STRYKER: If you will tell us, or if you will tell your live stock exchange at Indianapolis, or the live stock exchange at the public market closest to you that any of their people are sending stuff to your state under false pretenses, they are lying to get that into the state—because that is all it is, and it is just as criminal as anything I know of—I will guarantee you that you will have far less trouble; that our people will help clean up. It was not an idle suggestion I made that we want to co-operate. We owe a duty to the people of this country, we owe a duty to the health of the live stock. We want to help you, and we will help you, we will help Iowa or any other state.

DR. BURNETT: My meaning is this. When Holstein cattle, leave the stockyards, the commission firm knows they are not grazing cattle. They do not graze Holsteins for beef. They are dairy cattle, and yet they come with a certificate that they are grazing cattle.

MR. STRYKER: I am not here to defend the rascal, and the man who says that he is taking Holstein cattle out to feed, as a general proposition, he is a lair. He should not be defended, neither should he be protected. My experience, however, has taught me, that most of the people who take stuff to states surrounding us live in those states themselves, and come to the public markets and buy stuff, and where he gets it and takes it home, it seems to me it is rather up to you to police yourself. If a man is a liar and a rascal, you ought to put him in the penitentiary, and I will help you.

DR. BURNETT: I don't believe you get my meaning yet. It takes so much of our time. We are spending this year $100,000 in Ohio to compensate people for reacting cattle. What is the use of us expending $100,000 in Ohio to compensate people for cattle and allow Wisconsin or Illinois or Kansas City to ship reactors in. That is a matter that will have to be explained to me.

If the compensation proposition is a good thing, the very first thing to do is to safeguard what comes into your state. It takes too much of our time to do it.

DR. COTTON: Mr. President, prior to Regulation 7, going into effect on July 1st, it is true that we had various regulations in different states which were conflicting. The Federal Bureau and this association had tried year after year to get something more uniform, and we should not condemn the Bureau for putting in their Regulation 7. They did the best they could. It was a hard proposition to get a regulation which would apply to all territories. Each section of the country has different problems, and it is almost impossible to get a regulation which will apply to all of those in the various states.
In Minnesota, since 1903 we have required a test of anything over six months old coming into the state. It is a statutory law, and we have practically the same condition at the South St. Paul yard that they have at Kansas City, Omaha and Sioux City, and we were taking care of the springers, dairy cattle, and last January we put bulls on, feeling that they were going on for dairy or breeding purposes.

After Regulation 7 went into effect, in paragraph 3, they allowed all cattle on an affidavit from the owner to be shipped interstate for feeding and grazing purposes without the tuberculin test. The sub-paragraph 2, which states the quarantine provision provides for quarantining those animals, and that the quarantine shall continue unless the animals are sent back for slaughter.

Another paragraph allows heifers, so-called Oakland heifers, up to three years old, to be shipped interstate on the certification of the owner, without any affidavit, without quarantine.

Minnesota has spent in the neighborhood of $500,000 trying to clean up tuberculosis, and a number of other central western states have done the same, and they look upon this regulation as dangerous.

It is not the honest men we are afraid of, but in all these markets there are cow jockeys, and people who are constantly looking out for any relaxation in any regulation, and if they can induce you to relax the least little bit so that they can take advantage of you, God help the sanitary authorities of that state. It is not the honest man and the farmer, it is the cow jobber and the cow jockey.

It is provided that these animals can be shipped from one state to another on the affidavit of the owner, but they can only be shipped from stockyard center to a stockyard center, which means where trading, buying and selling goes on.

We do not allow anything to go out of St. Paul over six months old unless it is tested. Commission men said that it was playing into the hands of the big packers' interests, because there were a number of cattle came in there for slaughter. But we think, gentlemen, that honest men would rather have that test made, and if that animal happens to develop into a nice dairy animal, the owner can get six or eight dollars more for the animal. If it does not develop out in the country, then he can ship it in for slaughtering purposes.

At the tuberculosis conference we recommended some changes in Article 7, which I hope will be adopted. In other words, it is recommended that they eliminate the paragraph regarding heifers up to three years old, the so-called Oakland heifers being shipped for feeding purposes, and the recommendation is that feeding cattle cannot be shipped on affidavit, except to states which have quarantine provisions.

So far as that goes, we are all satisfied we can take care of the she-animal and the animal with testicles that goes into our country for so-called purposes. When this regulation first went into effect, any number of men took advantage of it immediately, and would buy animals and make affidavit, and change their mind by the time they got to the railroad yard at destination, and sell them right at the yard to the farmers that we have compensated for diseased animals. The honest man is not the man we are afraid of; but the regulations are for the crook.

Dr. Davis: Mr. Stryker has been making reference to the dishonest veterinarian. I am of the opinion that in many instances that is cor-
rect. The veterinarian belongs to one profession, the live stock commissioner to another. There are some men today in the live stock commission business that are as crooked as they make them. They will swear to any sort of an affidavit that you want to put before them.

I hold in my hand here, Form 24-B, issued at Denver, Colorado, for a shipment of 34 head of cattle for grazing purposes. To that is attached an affidavit that there are ten bulls that are going to the state of Wyoming, to be used for feeding and grazing purposes. We use bulls in Wyoming for the purpose for which they are intended. A Wyoming stock man that I have absolute confidence in went to the Denver stockyards to buy some cattle. He bought some cattle expressly for grazing purposes, and contracted for ten bulls, and the last words that he said to the Rogers Commission Company, of Denver, was: "I want you to have those bulls tuberculin-tested. I want to ship them up into Wyoming, and Wyoming requires a tuberculin test, and that is how I want you to send them to me."

Mr. Rogers shipped the bulls, and Mr. Rogers made the affidavit. After this shipment was received in Wyoming, I wrote to this Rogers Commission Company as good a letter as I knew how to dictate, and he did not have time to answer it. I sent him a telegram, asking him to read a certain letter, and to reply at my expense. He did so and the substance of his telegram was that it ought not to cost any more in Wyoming to test these bulls than it did in Denver, and to have it done.

This is the first instance of a commission company trying to put one over on the state of Wyoming, and one of its most reliable stock men. I can assure you we got busy right away, and we propose to find out just what constitutes an affidavit, and what a commission man means when he swears to the facts therein contained, when the understanding was that the purpose for which the cattle were purchased was for breeding purposes. We don't like it and our stock men don't like it.

MR. STRYKER: Did you submit charges against this party to the Denver Live Stock Exchange?

MR. DAVIS: I have a letter of introduction to the United States attorney, and with the assistance of our governor, we are going to go right after him.

MR. STRYKER: You will find assistance on the part of the reputable dealers on the Denver market. I do not recall the Rogers Commission firm there, but if you say they are there, I will take your word for it.

DR. DAVIS: There is the affidavit, the Rogers Live Stock Company.

MR. STRYKER: I don't know the firm. They are undoubtedly there if you say they are. I am wondering if they are not just what this gentleman termed jockeys a few moments ago.

DR. DAVIS: They are not right.

MR. STRYKER: They are not right if they do that kind of work. I am not going to try to defend them.

DR. DAVIS: I think this is a rotten deal, and we are going to try to get them.

MR. MALCOLM: There are always two sides to every question, and in Mr. Stryker's paper he centered his argument all on one side. I happened to be a member of the Commission on Animal Health a short time. When I went on the board they were having trouble with this
gentleman about the cleaning and disinfection of cars. The board thought the best thing to do was to invite this gentleman to a hearing with us on the matter. An invitation was extended to him, but he never appeared, but he comes from his home to the great city of Chicago to air his ideas.

I am proud to be on the Live Stock Sanitary Board of the State of Iowa. I am going to devote my time on the Live Stock Sanitary Board to the interests of the breeders of live stock in the state of Iowa.

Our legislature appropriates $100,000 a year for tuberculosis. We invited this gentleman to come, and I am giving him another invitation to come any time and we will give him a fair, square deal.

Mr. Stryker: I will be glad to accept that invitation if you will just be sure that the next invitation I get reaches me prior to ten o'clock on the morning of the day you have a meeting, and I will guarantee I will be there.

Dr. Davis: I believe that would be a fair way, rather than to come here and make Iowa a boxing ground, make a target of Iowa.

We are on this Live Stock Sanitary Board, at least, I feel that I am, to protect the stock men. We are not there to protect the commission men, because they are amply able to take care of themselves.

In one of the open meetings that we had, a representative of the stock men came with a complaint. I asked him if he would be willing to load cattle into a car that he knew cholera hogs were unloaded from, and ship those cattle onto his farm and put them in his feed lot, and the answer was that he would.

Is there any argument—is there any gentleman here who would think of doing that? You would not yourself.

Mr. Stryker: Of course not, absolutely not. When a car of hogs reaches a public market and the B. A. I. employes discover that cholera hogs have been loaded in that car, they immediately order that the car be cleaned and disinfected at the expense of the hog owner, and that is perfectly proper.

At this point President Dunphy resumed the chair.

Dr. Eliason: We can sit here and talk, and pass resolutions, but this will never solve this situation. There is only one thing that will solve it, and that is to provide a way to get the cattle in the feed lot. Let a man change his mind as many times as he wants to, but take care of him when he gets to the feed lot. You cannot do it by regulation or resolution or anything else. I move the discussion close.

Motion duly seconded.

Dr. Stange: Mr. President, inasmuch as I was considerably interested in the adoption of that law, I wish to make a few remarks regarding this section.

The section that he read first was written in co-operation with, and on the recommendation of the stock men of the state. I think it is one of the most comprehensive, broadest sections that you can possibly write into a law.

The second section that he referred to was put in at the request of, and due to the influence of the commission men and these stock markets, and not because the live stock of the State of Iowa wanted that section. They preferred not to have it, but it was through the
influence of the commission men and the stockyards that that section was put in.

The attitude of the stock men when that law was before the legislature was, that it was purely for their protection, and if it needs to be revised and changed in order to help out the commission men, I think it will have to be done when the stock men are not looking.

The commission men are too apt, in my estimation, to overlook or disregard things that happen in the neighborhood, and many times on a number of farms surrounding the one to which the shipment is made. They are concerned only with the sale of stock and getting them out of the yards, and our concern is the protection of the health of the animals on the farm. It seems to me, that is where the conflict is.

PRESIDENT DUNPHY: Gentlemen, there is a resolution before the house, but I am allowing a little latitude on this. I would like to hear from Dr. Wall.

DR. WALL: I would like to explain one thing, and that is the quarantine proposition that seems to be more or less a bone of contention, and that matter as it stood in Iowa before this regulation went into effect was that we required the testing of all cows, bulls and heifers that came into Iowa, regardless of the purpose.

This was compelled and enforced generally for the reason that there were some crooks, or stock scalpers, or cow dealers, whatever you might call them, going to these markets, buying up a carload of cattle and shipping it into territory where people had small herds of dairy cows, and selling them out among the farmers, and complaints were continually coming in, why do we have to test our cattle? Here is a man going to Kansas City or Omaha and buying a bunch of cattle, and peddling them all over the territory, and we are compelled to buy under our test regulation.

We had a conference last year in Chicago on this subject, and Regulation Number 7 was proposed, and most of the states agreed to adopt the provisions of Regulation 7, and Iowa did adopt that regulation. That regulation provided for the shipping of cattle on an affidavit of the owner, or shipper, that they would be shipped for feeding and grazing purposes only.

We came to find out in many cases those affidavits were signed by the shipper without the knowledge of the owner or the producer of the cattle. It is a daily occurrence in my office to have some owner come in when I have sent him a quarantine on his cattle, wanting to know why his cattle are quarantined. I immediately present him with a copy of his affidavit, with his own signature, or the signature of the shipper, and he says: “Well, I never knew that was signed, never knew the provisions of that.” I said: “How did it happen you signed it?” He said: “It was shoved out to me the same as a bill of lading or anything else, and they said, “Sign here, so that we can release your cattle.” No explanation of how he should handle his cattle or what they were to be used for after he got them.

We had a case just a day or two before I left, of a party coming in with the same kind of a complaint. I said: “You have an affidavit on that shipment that you are going to use them for grazing purposes only,” and yet he had ordered them for dairy cattle. He said: “I am going to breed those cattle. My brother has taken some of them.” I said: “Your affidavit states you are going to use them for feeding and
grazing purposes." I went back to the commission firm, and of course they said it was done through the error of some of the clerks, and that proposition is going on regularly.

Another thing I learned that was new to me was, that a great many of these affidavits were issued to the shippers by the inspectors, and no one ever knew what cattle a certain affidavit covered. A party could go to the inspector in charge and say: "I want an affidavit for a carload of steers to go to Iowa," and he immediately got it. There is no test or quarantine requirement on steers. We look it up and we find it is a carload of cows. How did it happen? He came there and bought cows, he asked for a certificate on steers, and for some reason or other got it—whether he was posted to do that or not, I am not going to say, but it does seem to me the commission men are not taking proper steps to help us in enforcing these regulations, and providing for the protection of our home herds in the way they should on these affidavits.

We have been assured the co-operation of these live stock exchanges, but we do not seem to be getting a great deal of it.

Another thing on quarantine that meets with considerable objection from commission firms is when we place them in quarantine separate and apart from other herds, and they say: "Why, that is useless. Let him bring his cattle, his feeder cattle in and feed them with the rest of his cattle. Let him use his dairy cattle, let him milk his cows, let him sell the product of his dairy herd or distribute wherever he pleases, without restriction, but quarantine the feeder cattle."

It appears that they think there is no danger to the immediate herd, but there would be danger in disseminating to the herds of other farms. I don't see why there would not be just as much danger to his own cattle, as there would be by letting these cattle come in and be dispersed all over the country.

Dr. Gibson: I enjoyed Mr. Stryker's paper very much. It was a good paper and very well prepared from his viewpoint, but the discussion, I notice, has overlooked up to this moment probably the most important of all the attempts at live stock sanitation that will prove its value when lived up to, and that is the condition of the stock markets.

I am glad that Mr. Stryker has been able to show us to what a wonderful extent that disease has been prevented by cleaning the cars. I would suggest that if there was disinfection of the cars following the cleaning, we would be pretty near perfection in that particular case.

I am a champion of the policy of disinfecting stock cars for all stock, above all stock that goes to the farmer. I think if it is required that that expense be borne by the shipper or the purchaser of the cattle whose interests are protected by the cleaning and disinfecting of the cars, it will be the best money that farmer ever spent. I have argued for years that the Bureau of Animal Industry should require universal disinfection of stock cars, at least of stock cars that carried stock to the farms. It is not so important for stock carried to the markets for sale, and I sincerely hope that there will still be advancements along this line, and that the cleaning and disinfection of stock cars will come into common use, because in my judgment it will do more to protect the live stock of the United States against disease than all other regulations combined.
Dr. White: Speaking for the Bureau on Regulation 7, when the tuberculosis conference was in session here two months ago, a committee was appointed to take up matters pertaining to Regulation 7, and as a member of that committee, I will say it was reported that certain suggestions and changes be made. The Bureau has this matter under serious consideration, and is doing everything it can in co-operation with the state authorities, to see that the changes are for the best.

There is one other point in regard to the shipment of cattle from stockyards on affidavit. We had been getting reports from some sections of the country that cattle were going out from certain stockyards without an affidavit, and immediately steps were taken to prevent any further occurrences of the kind, and today the inspectors at the stockyards are looking after that much more closely, so that when an affidavit is issued to cover feeders, or any shipments made of cattle to country points, an effort is made to look them over to see that they are the class of cattle that are called for. The Bureau is ready to co-operate in every way that is possible, and any suggestions that you may have to offer we shall be very glad to have.

President Dunphy: There is a motion before the house that the discussion be closed. I have allowed what might be considered a breach of parliamentary rules on this question, simply because I wanted to hear this important matter discussed. I, unfortunately, am a state veterinarian, and it may be a little consolation to me to know that my state is not the only one that is having trouble with dishonest commission men.

Are you ready for the question?

Mr. Stryker: Before you put the question, I would like to say a word or two. I am not here to defend these commission men. They do not need it. I was asked to come here and read this paper, because of my known willingness to co-operate with those who want to work to help to eradicate disease.

I do not like, if you please, Mr. Chairman, your suggestion of dishonest commission men. I do not think you should have used it. I am sorry you used it, because there are bad spots in every line of business. We have them unfortunately in ours. We are trying to clean up. We are trying to keep clean, and I do not like to have every Tom, Dick and Harry who may go to a public stockyards, who may live in your state or some other, and lie, classed with our commission men. I am sorry you called our commission men dishonest.

President Dunphy: Mr. Stryker, by way of explanation to you, I did not classify the commission business as a dishonest profession or a dishonest occupation, but I said distinctly dishonest commission men, and reports in my own office are positive proof that there are dishonest commission men, and these are the only men that I referred to. I was not casting any aspersions at all on commission men in general; because I find lots of honest, intelligent, conscientious, commission men; but remember I said dishonest commission men. Those are the men that I referred to, men that put something over on the different states.

A Delegate: You did not take any more liberty with commission men than he took with the veterinarians that he referred to as dishonest.

Dr. Eliason's motion prevailed.
President Dunphy: There is a very important report to come up before this meeting, and I think that we had better have it now. That is the report of the Committee on Tuberculosis and Discredited Herds, by Dr. Kiernan, Chairman.

Report of Committee on Tuberculosis and Discredited Herds

By J. A. Kiernan, Washington, D.C.

A joint committee representing the pure-bred cattle associations and the United States Live Stock Sanitary Association, met in Chicago, December 1, and unanimously decided that no steps should be taken to lower the high standard of the present plan.

It was decided that no herd should be accredited if it contains a tuberculous animal, male or female. Recommendations were made to the committee that some provision should be made for giving credit to herds under supervision that, excepting the herd bull, are free from tuberculosis. It was agreed by the joint committee, to show that owners are exerting an effort to exterminate the disease, that a supplementary list be made to the accredited herd list to contain the names of the owners of pure-bred herds that are free from tuberculosis on two annual tests, but in which the herd bull reacts. Such a herd will not receive an accredited herd certificate. The reacting bull may be used under the following conditions:

1. He shall have passed a satisfactory physical examination and be kept in isolation and quarantine under state supervision.

2. When it is desired to breed cattle to the reacting bull such cattle shall be taken to the bull and bred on neutral ground. The bull shall be controlled on a staff or halter.

The listing of a herd in this manner will be purely optional on the part of the owner. No herd will be so listed unless the owner agrees in writing.

The joint committee agreed that the present plan should be modified in reinstating to the accredited list, herds which were previously on that list but were removed because at a subsequent test reactors were found. The amendment as adopted is as follows:

An accredited herd in which not more than one reactor is found at a subsequent tuberculin test may be reinstated to the list if the entire herd passed a successful test without reactors, the test to be applied not less than six months from the date when the reactor is removed from the herd and farm, providing the owner has complied with all requirements with reference to the introduction of additional animals into the herd and, also, all other requirements of the accredited herd plan.
Testing by Private Veterinarians

The committee unanimously agreed to the following provisions for the testing of accredited herds by private veterinarians:

1. When a herd has been officially accredited continuously by the United States Department of Agriculture and State authorities for a period of two years it may then be tuberculin tested annually by any veterinarian whose name is upon the accredited list of veterinarians approved by the United States Bureau of Animal Industry, provided that before any veterinarian other than one who devotes his entire time to the work of any state or the Bureau of Animal Industry can be approved for accredited herd work, he shall have passed an examination conducted by the proper live-stock sanitary official of the state in which he resides, and the Bureau of Animal Industry. He then shall be eligible to conduct annual tuberculin tests upon herds which have been officially accredited upon dates approved by the proper state live stock sanitary official and the inspector in charge of the Bureau of Animal Industry in the state wherein the herd is located.

2. No herd test may be made by such an approved veterinarian unless he has instructions in writing from the state official to that effect. The dates of the annual tests for each herd shall be recorded in the state office and, also, in the office of the inspector in charge. On any annual test the state and bureau reserve the right to have a regularly employed official present on the farm to supervise the testing done by the approved veterinarian.

3. The approved veterinarian shall conduct each test strictly in accordance with instructions issued by the Bureau of Animal Industry to employees engaged in co-operative tuberculosis eradication work. At the conclusion of each test the approved veterinarian shall submit to the state veterinarian and the inspector in charge of the Bureau of Animal Industry, a copy of the record of the test.

4. Any animal of a herd under supervision which may react in any herd tuberculin tested by an approved veterinarian shall be marked for the purpose of indentification in accordance with the regulations of the state in which the animal is located.

5. Tuberculin tests applied by veterinarians other than those regularly employed by the state and Bureau of Animal Industry shall be paid for by the owner of the herd.

Separate Sections for Herds

The committee went on record as indorsing the plan for providing separate sections for accredited herds and herds in the process of accrediting at all live stock exhibitions, state and county fairs. Another provision unanimously adopted is the recommendation that state or federal authorities supervise the cleaning and disinfection of all barns used for live stock exhibitions.

The joint committee was composed of the following representatives:
A. B. Cook, President of the American Hereford Breeders' Association.
Fred Pabst, representing the Holstein-Friesian Association of America.
Geo. B. Grout, representing the Guernsey and Red-Polled Cattle Clubs.
John R. Thompson, President of the American Shorthorn Breeders' Association.
Dr. C. E. Cotton, Secretary and Executive Officer of the Live Stock Sanitary Board of Minnesota.
Dr. Fred Torrance, Veterinary Director-General, Ottawa, Canada.
W. W. Wright, Superintendent, Division of Animal Industry, State Department of Agriculture of Illinois.
Dr. Peter F. Bahnsen, State Veterinarian of Georgia.
Dr. J. A. Kiernan, Chief, Tuberculosis Eradication Division, Bureau of Animal Industry, Washington, D. C.

President Dunphy: You have heard the report of this committee, and I think you will notice one thing in regard to this report, that the various recommendations were unanimously agreed to by the committee. This committee consists of representative men in the livestock industry, in the regulatory work and the veterinary profession.

On motion, duly seconded and carried, the report was adopted as read.

President Dunphy: I have just learned that Mr. McKerrow, who was to be on our program this forenoon, is present, and if so, I would like to call upon him for a short talk.

Mr. George McKerrow: If I was on this forenoon's program, I will have to take your word for it. I thought I was on the afternoon program, and I can only say that I was busy showing sheep this morning at the stock yards.

There seems to be a difference in your viewpoints, gentlemen. I have been listening to your arguments, and it reminds me of the story of a Jewish loan broker and a would-be borrower. The borrower, who was doing a little peddling business, wanted to enlarge his business, and therefore he went to the broker, and said, "Ikey, I would like to borrow a little money to enlarge my business. Can you let me have it?" Ikey said: "Oh, yes, I can let you have it." "What interest would you charge a brother Jew for a little loan?" He said: "Well, you know I charge the Gentiles ten per cent, but as you are a brother Jew you can have it for nine per cent." "But, Ikey, a Gentile can loan money for six per cent, and what will the good Lord think when he looks down from above and sees that you charge a brother Jew nine per cent?" "That is all right, Jakey. The good Lord will look from above, and he will think that nine was a six."
Usually when I get up before an audience of farmers in this country or Canada or Great Britain to talk sheep husbandry, I have it in mind that they are sheep men, but you don't look like a very sheepy lot. I judge you to be a lot of sanitarians and veterinarians, but I am going to ask you a question: How many of you are interested directly, financially in sheep husbandry? Please hold up your hands. There are three or four real good looking men here that say they are.

Sheep husbandry is something that is a very important thing for the country. We have been talking patriotism pretty strongly for a few years back, and I believe that any move that aids the production of food and clothing material is patriotic. Therefore, when we discuss sheep, it is patriotic, and it is economic.

A flock of sheep on every farm where they should be maintained—understand, all farms are not suitable for sheep, nor are all farmers suitable for sheep-raisers—I feel that would save much feed that would otherwise go to waste.

The first thing that a man should do who attempts to go into the sheep business is to study his farm, and then study himself to see if he is suited to the handling of sheep. If he makes up his mind that he and his farm are suited to the business, then he should go into it with the idea of staying in it. There are more ups and downs in the sheep industry than in any other I know of. I have seen sheep sell at one dollar a head. I bought them for that price many years ago, and I have held them, and inside of two or three years sold them for four and five times as much.

I do not think there is any live stock business in the country that has had such varying conditions up and down as has the sheep husbandry. I do not know just why it is, but when prices go down it is very easy to unload a bunch of sheep, and when they go up it may be easier to stock up, but if one goes in and out of the sheep industry the same as any other line of live stock industry, it is bad policy. When you go into a line of industry, you fix your farm and your buildings for it, and when you change to something else you have to change these conditions. Make up your mind to stick to it through thick and thin.

If you go to Great Britain and travel from Southampton on the south to northern Scotland, you see different classes of sheep in different districts, depending on the soil conditions. On the rich soil you find large breeds of sheep, the Lincoln, Cotswold, and all those larger breeds, and when you get into districts where the soil is not quite so rich, you find the middle breeds, medium in size. You come into the very light soil district, and there find the small breeds. A man should study his farm in order to decide on the type of sheep he will keep. There is another condition here in the United States that strikes us more forcibly than it does in Great Britain, and that is the market and market conditions. The production of lambs to be sold in the early fall or carried over the winter, where feed is being grown cheap—there isn't any cheap feed any more—but where it can be grown cheaper, you probably want to carry your lambs over and feed them during the spring, because our market needs a steady stream, and the smaller breeds that will meet market conditions will probably pay you just as much or a little better profit than the others.
When you make up your mind which particular breed suits your conditions best, by using good ewes and a good pure-bred sire of the breed you have settled on, you can soon develop and begin producing, but before you go into the breeding of pure-bred sheep, get your idea fixed as to what you want to breed, and breed to that type through thick and thin. Do not let yourself be led astray, but be sure that you have an ideal, and then breed to that ideal, and breed in line.

Some people are afraid of line breeding, they say it is inbreeding. Yes, it is inbreeding, and does our breeding of live stock lots of harm. I can point to some breeds that have been killed by inbreeding; but if you select animals for line breeding that have every evidence of a vigorous constitution, life, energy, and couple those with their relatives, I do not care how close, of high type, meeting your ideal, you will get a perfect type, and as a rule you will not injure the constitution, if all of the animals used are of the best constitutional development.

On the other hand, if there is weakness and you line breed, you will destroy the whole thing, the whole development. It requires good judgment.

Wool and mutton are the things that make the sheep business profitable, and we know we cannot get the maximum of one without getting the minimum of the other. It is like the dual purpose cow. If you have the mutton idea intensified, breed for the best mutton type and the best texture of mutton to please the tooth of the epicure, and you will get a minimum of wool, but you can have your dual purpose sheep. You can have a sheep that produces a fairly heavy fleece of combing quality, and at the same time produces a fairly good texture of mutton.

The texture of the flesh is indicated by the outside covering of the sheep, just the same as by the hair on a horse, especially on the legs. If you want to get bone in a horse, get fine silky hair on the legs, and with sheep, take one with very fine wool on the surface of the body, and when you feed it, it puts the fat all on the inside, on the coating around the stomach, and the meat will be lean, but you cross to the other extreme in wool, and then you find the mutton fat and lean, so that it is juicy and toothsome.

Do not go by the black face or the brown face. The Southdowns are the ideal high-class mutton which the nobility breed in Great Britain; so they can have the choicest mutton, and they think that the mouse-colored Southdown is the highest quality of mutton, but it does not, any sheep that carries that class of wool will give you that class of mutton.

Feed and care are important, but feed cross is just as important as the breed cross. If you go into breeding stock, you must keep your mind on cross as well as breed. All ewes should be flushed as we term it, at the time of breeding, starting just a little bit before, so they are all on the up-grade, and you can look for healthy, strong, vigorous lambs, more twins, and a higher percentage of lambs coming to maturity.

PRESIDENT DUNPHY: There is a report, I believe, coming to us from the Finance Committee by Dr. F. A. Bolser, Indiana, Chairman.

DR. BOLSER: One member of our committee was so unfortunate as not to get here, but Dr. Burnett and I have gone over the situation, and we submit a short report.
REPORT OF THE COMMITTEE ON FINANCE

Your committee has checked the accounts of the secretary-treasurer and found them to be correct (for summary see report of secretary-treasurer).

FINANCIAL STATEMENT.

Balance on hand Nov. 30, 1918 .................................................. $977.66

RECEIPTS.

Advertising ............................................................................. $474.00
Dues 1916 ................................................................................ 1.00
Dues 1917 ................................................................................ 4.00
Dues 1918 ............................................................................... 52.00
Dues 1919 ............................................................................... 257.00
Dues 1920 ............................................................................... 300.00
20th Annual Reports ................................................................. 4.00
21st Annual Reports ................................................................. 11.00
22nd Annual Reports ................................................................. 339.00
New Applications .................................................................... 570.00

2,012.00

Expenses .................................................................................. $3,989.66

Balance on hand Nov. 29, 1919 .................................................. $1,033.83
Bills receivable from advertising ................................................ 450.00

$1,483.83

F. A. Bolser,
Theo. A. Burnett,
Chairman.

On motion, duly seconded and carried, the report was accepted.

President Dunphy: The next is the report of the Committee on Credentials by Dr. P. F. Bahnsen.

Dr. Bahnsen: Your Credentials Committee has only been presented with six applications for membership. Four of these are properly endorsed, two, are not properly endorsed, and your committee therefore suggests that the two that are not properly endorsed, be held over until the next meeting, and that the other four be elected to membership. One is Fred H. Burt of Illinois; A. T. Erickson of Donovan, Illinois; C. E. Fidler, Canton, Illinois; John J. Glover, Kansas City, Missouri. The two that are not properly endorsed are Frank M. Boyd and E. A. Grabb.

Dr. Timmons: I will endorse Mr. Boyd’s application.

Mr. Bahnsen: The Committee therefore recommends that these five, including the four read, and Frank M. Boyd, be elected to membership, and that the application of Dr. E. A. Grabb be laid over until the next meeting.

On motion duly seconded and carried, the report was accepted.
TWENTY-THIRD ANNUAL REPORT

PRESIDENT DUNPHY: The next is the report of the Committee on Resolutions by Dr. J. I. Gibson of Illinois. There are seven resolutions in the hands of the Chairman of the Resolutions Committee. Dr. Gibson submitted the following resolutions, which were taken up seriatim:

RESOLUTION 1

WHEREAS, We are still face to face with the very high cost of living; and
WHEREAS, We recognize the splendid work accomplished by our committee on legislation in the interest of increasing the salaries for the men of the Bureau of Animal Industry, U. S. Department of Agriculture, we still feel that this splendid force of men are serving for remuneration insufficient to meet the demands upon them and their families, and we therefore recommend that this committee be continued, and instructed to again visit Congress and put forth their best efforts for a still larger and more substantial increase in the salaries of Bureau employes.
Resolution adopted.

RESOLUTION 2

WHEREAS, Your Committee, recognizing the importance of the work assigned to the committee on hog cholera control, and the committee on differential diagnosis of swine diseases, and the value of the splendid reports presented by these committees during this session of the association, most heartily recommends that these committees be continued with the request that they pursue their investigations and report to the next meeting of this association.
Resolution adopted.

RESOLUTION 3

WHEREAS, Your Committee, recognizing the importance of the mission of the Horse Publicity Association of America, which has for its object the restoration of the horse to his proper place in the field of commerce and the service of men, most heartily commends the movement and recommends that this association and its members shall at all times and under all circumstances champion the cause of the horse in America.
Resolution adopted.

RESOLUTION 4

WHEREAS, Many horses are shipped interstate from time to time during the year for racing and exhibition purposes; and
WHEREAS, Several states have regulations requiring that all equine animals be subjected to a mallein test and that their interstate shipment be accompanied by an official health certificate including record of such test before they will be accepted in such states; and
WHEREAS, It is generally known that horses used for racing and exhibition purposes are kept in as nearly perfect health and condition as is possible to do and are seldom if ever exposed to glanders; therefore, be it
RESOLVED, That this association recommends to the officials of those states having such regulations and requirements that their regulations be so modified that shipment may be made when accompanied by an official health certificate exclusive of record of the mallein test.
Resolution adopted.

RESOLUTION 5

WHEREAS, The deliberations of the United States Live Stock Sanitary Association are devoted entirely to the welfare of the live stock industry of the country; and
WHEREAS, The scientific papers and discussions read and entered into during its meetings are of great benefit to all parties interested; and
WHEREAS, Multiplying requests are coming to the officers of this association from the agricultural and live stock papers of the country for concise, concrete reports of the many important problems considered by this association at its meetings; and
WHEREAS, Your committee believes greater publicity along these lines would add to the influence and accomplishments of this association, bring-
RESOLUTION 6

WHEREAS, Our highly-esteemed friend and co-laborer, Dr. John R. Mohler, Chief of the U. S. Bureau of Animal Industry has, during his term of office, conducted affairs of that great Bureau most satisfactorily and through whose devotion to duty and interest in all matters pertaining to live stock sanitation, much has been accomplished for the general good of the live stock industry in bringing about a closer co-operation of all officials, both state and federal, in this great work, and

WHEREAS, It has come to the knowledge of your committee that the opportunity has been presented to him whereby he might be the recipient of substantial financial gain, and

WHEREAS, In the face of such offer he has chosen rather to remain with the live stock sanitary forces; be it

RESOLVED, That this association heartily endorse his administration as Chief of the Bureau of Animal Industry and express its sincere appreciation of his choice to remain as Chief of the Bureau of Animal Industry, in which position we believe he can render higher service to the great live stock industry in which we are all so vitally interested; be it further

RESOLVED, That this resolution be spread upon the minutes of this association and an engrossed copy be presented to Dr. Mohler as conveying to him our gratitude for his noble, self-sacrificing decision in the matter.

Resolution was adopted.

RESOLUTION 7

WHEREAS, It has pleased the Almighty Creator to take from us our beloved and valued friend and associate, Dr. S. H. Ward, of Minnesota, and

WHEREAS, In the death of Dr. Ward this association has suffered the loss of one of its oldest and most loyal members, who during its infancy as an association, devoted very much of his time and energy to its support and up-building, serving as its secretary and also its president, and again accepting the secretarship from a sense of duty and this loyalty kept him at his post during the last annual meeting when the condition of his health was such that this devotion to duty and his loyalty to the association was without doubt one of the causes of his untimely death, and

WHEREAS, He was truly one of nature's noblemen, a boon companion, and a loyal friend, therefore

BE IT RESOLVED, That we deeply mourn his loss to this association and to the live stock industry of the country, and that his friendship and loyalty shall ever be fresh in our memory, and be it

FURTHER RESOLVED, That these resolutions be incorporated in the proceedings of this meeting and that a copy be forwarded to his family, expressing our love and sympathy.

Resolution adopted.

RESOLUTION 8

WHEREAS, In the death of Harry C. Moore, of Indianapolis, Indiana, this association has lost one of its valued members and friends and one who worked untiringly for the betterment of the live stock industry and this association;

BE IT RESOLVED, That this association express its appreciation of its great loss and that the memory of his personality, zeal and high ideals will continue to be a strengthening stimulus to live stock sanitarians;

BE IT FURTHER RESOLVED, That a copy of this resolution be sent to his family with our sympathy and love, and that a copy be spread on the minutes of this association.

RESOLUTION 9

Further resolutions, covering the deaths of Dr. Frank H. Anderson, Evanston, Illinois; H. A. Greer, Danville, Illinois; R. A. Luzader, Morrisonville, Illinois; W. B. Mack, Reno, Nevada; J. T. Nattress, Delevan, Illinois, were as follows:
WHEREAS, It has pleased, Divine Providence to remove from our midst our beloved friend and fellow member; and

WHEREAS, In the death of this member this association has suffered the loss of a faithful member and loyal co-laborer, whose genial presence and assistance we have missed; be it

RESOLVED, That we mourn his loss to this association, and to the live stock industry of the country, and be it, further

RESOLVED, That this resolution be incorporated in the proceedings of this meeting and a copy be forwarded to his family expressing our sincere sympathy.

On motion duly seconded and carried the report was accepted.

PRESIDENT DUNPHY: There are a number of applications for membership that have been passed upon by the Executive Committee. There has been more or less of a hitch in passing upon these applications.

SECRETARY CAMPBELL: An amendment to clear up this matter that the President suggested, and just mentioned, has been offered, an amendment to Section 6 of the By-Laws. (See proposed amendments to the constitution and by-laws elsewhere in this report.)

Also a further amendment as follows: (See proposed amendments to the Constitution and by-laws elsewhere in this report.)

DR. BAHNSEN: In order that we may act on this thing intelligently, I suggest that we first of all vote for a suspension of the rules and regulations—the by-laws, I should have said. We cannot make this change, unless we first act by suspending the by-laws, in order that these changes may be made to take effect immediately, and I therefore move that this association suspend the by-laws until the by-laws can be amended.

DR. BIRCH: Mr. President, I would like to ask which by-laws should be suspended.

DR. BAHNSEN: Sections 10 and 11.

Motion duly seconded.

DR. NIVEN: I understand that the original purpose of this body was that we would organize a side organization to assist men in their official capacity. Later it was enlarged, and to make this change would practically disfranchise 90 per cent of our number. There is nothing to prevent these officers from performing their functions.

DR. BIRCH: I am not saying which side I think I am on, because I do not know. I have not had time to consider it, and that is the trouble with making this amendment so suddenly. I certainly do not believe that this motion should pass at this time.

Motion duly seconded.

(At this point Vice-President Eliason took the Chair.)

DR. BUTLER: I believe that according to good parliamentary procedure, any organization may, on a two-thirds vote, suspend its by-laws, and I believe the question before the house at the present time is to suspend the by-laws, and that is all, as I understand it.

DR. DUNPHY: As I understand it, this motion was merely a motion for the suspension of the by-laws, and I do not see but what we are qualified to vote on that if we wish. I believe our Constitution says that the by-laws may be suspended by a two-thirds vote.

DR. COTTON: I rise to a point of order. I am of the opinion, subject to the ruling of the Chair, that in order to bring this before the
house that we should suspend the by-laws to consider a certain definite proposition. I think that Dr. Bahnsen should change his motion, and move that the by-laws be suspended, in order that we may act on this suggested change.

**Mr. Mercer:** Mr. Chairman, I do not think that the motion is a good one. I think that the motion should be to suspend the rules under which you proceed, and then to amend your by-laws.

**Dr. Dunphy:** Another question comes up. We can suspend the rules for the purpose of amending the by-laws, but according to our Constitution we must let this lay over for a year before we can do that.

I have no objection to your passing this Resolution, as a member of this association, but let us not think that if we pass this Resolution that we can amend the by-laws to take place today, because we cannot.

**Dr. Burnett:** The by-laws, as I understand it, are simply the rules of the association, and the motion is that we suspend those rules. That can be done in any organization to my mind.

**Dr. Devine:** I am not opposing this motion, but I have been wondering what the constitution provides. Will you please ask the secretary to read what our constitution provides?

**Dr. Gibson:** I would like information as to whether the constitution provides that by any vote, even by unanimous vote, we can immediately amend or change the by-laws.

**Dr. Staley:** The motion is to suspend the by-laws, and that is in accordance with parliamentary usage.

**Dr. Cahill:** May I ask whether or not our constitution and by-laws may be suspended this way?

**Dr. Kinsley:** I don't believe there is a member in this house not represented on the list who wants to vote upon questions that concern only the state authorities, but the question I wish to ask is this: Why rush this through at this time?

There isn't anything of any importance to go through now that should be taken care of, and why not let this go over until the regular meeting next year, and be taken up in the regular order?

**Chairman Eliasen:** The ruling of the Chair is: Dr. Bahnsen's motion is in order, but after the motion is carried, if it should be carried, the ruling of the Chair is that we cannot consider this amendment, because it would abridge members' right to vote, and notice must be given all members on all propositions that abridge their rights so that any that object to the abridgment of their rights under the existing constitution and by-laws may have an opportunity to be here.

(The question was called for, on Dr. Bahnsen's motion, and it was defeated by the following vote: Ayes, 51; Noes, 52.)

**Dr. Kinsley:** I move that these proposed amendments be received and referred to the Executive Committee, and take the usual course.

Motion duly seconded and carried.

**President Dunphy:** We are now up to the matter of Delayed Business.

There are a number of applications for membership here that have been passed on by the Executive Committee yesterday or last evening. There was more or less of a hitch in regard to passing on these applications for membership, and it came about in this way:
The by-laws and constitution of this association place this duty on the Executive Committee, but the usages of the association for the last few years have been to place this before the Credentials Committee. There was a mix up on that, and these applications for membership were placed before the Executive Committee according to the by-laws and constitution, but not according to our recent usages, and that is how the mix-up comes. A number of these applications have been acted on by the Executive Committee, and yet have not been passed on by the association, and the Secretary will now read these applications.

(See list of applications for membership on p. 287.)

DR. BAHNSSEN: I have here an amendment to Section 5 of the by-laws that I wish to read and to have brought before the association next year by the executive committee: (See proposed amendments to the constitution and by-laws elsewhere in this report.)

DR. LUCKEY: I move we proceed to the election of officers. Motion duly seconded and carried.

DR. BUTLER: We are all under a period of reconstruction in legislation, in the Bureau of Animal Industry, also tuberculosis eradication, therefore it is with a sense of duty and pleasure that I place in nomination Mr. L. H. Howard, Commissioner of the Bureau of Animal Industry of the State of Massachusetts, for President of the United States Livestock Sanitary Association.

DR. DEVINE: Mr. President, Dr. Howard has not been a member of this association as long as some of the others, and some of the newer members may not know him, owing to his reticence, and his modesty, for he is never in the spotlight, but I have known Dr. Howard for a quarter of a century, and I know him to be one of the most capable veterinary practitioners in the United States, looked upon as a high-class man. He is a capable state official, and this association will do itself great honor, and at the same time bring to itself a most capable head; by electing Dr. Howard, President of this Association. I second the nomination.

DR. WAY: I know something of the work that Dr. Howard has done in New England in the way of rejuvenation of agriculture, and animal husbandry, and it is a pleasure to second his nomination. I trust that the men from the west will recognize the good work that he is doing in the east, and that he may receive your support.

A MEMBER: Mr. Chairman, I move the nominations be closed.

MR. MERCER: Mr. Chairman, I don't think this proposition of shutting off nominations is advisable. I do not know whether there is a slate. I know nothing about anybody else's proposition.

The gentleman that has been placed in nomination may be an expert man, but I say that we ought to have some man out in the middle west, the livestock section of the nation, and I take great pleasure in placing in nomination Dr. S. F. Musselman of the State of Kentucky, for President of this organization.

DR. MUSSELMAN: Mr. President, I thank Mr. Mercer for this compliment, but I want to say that I do not desire the Presidency.

MR. MERCER: That is the reason we want you.
DR. MUSSELMAN: I want to extend my thanks to Mr. Mercer, but I insist that my name be withdrawn, and that the Secretary cast one ballot for Mr. Howard for the Presidency.

Motion duly seconded and carried.

CHAIRMAN ELIASON: It is moved and seconded that the Secretary be instructed to cast the unanimous ballot of the Association for Mr. Howard.

MR. MERCER: Mr. Chairman, I rise to a point of order. I placed Dr. Musselman in nomination, and I insist on him being voted on.

DR. MUSSELMAN: May I ask Mr. Mercer to kindly reconsider his nomination and withdraw it.

MR. MERCER: Mr. Chairman, I would like to please the doctor, but I insist upon the men being voted on that are placed in nomination, and I am in accord with electing someone out of the cattle-raising section of this country for President of this great organization. I am not casting any reflections against Mr. Howard, the gentleman from the east, at all. He is probably a wonderfully good man, but I think we have just as good men in the middle west or in the south as in the east. That is the country where the livestock is raised. We have more cattle in some of our western counties than they have in the entire New England states.

DR. MILLER: I second Dr. Musselman's nomination.

DR. GIBSON: Mr. Chairman, there is no man in this organization, or in this country, that I love and esteem more than I do S. F. Musselman, not the Kentucky Colonel, but the gentleman from Kentucky, if you please, and I also take great pleasure in seconding his nomination.

DR. DUNPHY: Mr. President, I would like to second the nomination of Dr. Musselman. I have known Dr. Musselman, and I have been associated with him for a number of years in this Association, and I believe that there is a man who is well informed and who has served this Association in the capacity of committeeman, and such as that, and if there is a man here that is entitled to the position and capable of taking care of the position, it is Dr. Musselman, of Kentucky.

A MEMBER: I move that the nominations close.

Motion duly seconded and carried.

CHAIRMAN ELIASON: I will appoint as tellers Dr. De Vine, Dr. Ranck, and Dr. Kierman.

DR. BAHNSEN: Are all present members of the Association?

(The tellers proceeded to collect the ballots and count them, with the following results: Total votes cast, 118.

Dr. Musselman, 84.
Dr. Howard, 34.

The following gentlemen were elected vice-presidents:
First Vice-President, Dr. Ranck.
Second Vice-President, Dr. Bolser,
Third Vice-President, Dr. Crewe.
Fourth Vice-President, Dr. Rives.
Fifth Vice-President, Mr. Mercer.

DR. GIBSON: Mr. Chairman, I rise to place in nomination for the office of Secretary-Treasurer, a gentleman who has rendered splendid
service to this Association. It affords me great pleasure to nominate the appointee of the President, Dr. Campbell, for the office of Secretary.

DR. DUNPHY: I take pleasure in supporting that nomination. I have worked with Dr. Campbell for the last six months.

I took a position in favor of getting new members, and I suggested this, that we should write to the different state veterinarians that if any of them had any new members they would like to suggest, we wished they would list them, and that is how we got in so many new members. We wrote to the state veterinarians of the different states, asking them to secure applicants for membership in this association.

I move that nominations be closed, and that the president cast the unanimous vote of the association for Dr. Campbell.

Motion duly seconded, and carried unanimously.

CHAIRMAN ELIASON: I hereby declare Dr. Campbell elected Secretary-Treasurer for the ensuing year.

On motion, duly seconded and carried, the Convention adjourned sine die.
Live stock sanitary conditions on the whole are quite satisfactory. Mange in cattle of certain sections of eastern Colorado is more prevalent than a year ago, largely owing to the fact that this disease has not received the attention of the stock owners during the past year or two that it formerly did, and a small amount of infection has been allowed to increase to larger proportions. Stock owners have awakened to the necessity of taking action in the matter, and a campaign has been started to dip all the cattle in the infected districts, and without doubt great improvement will be made.

Anthrax which takes a yearly toll in certain sections of the state has been much less prevalent than in most years in the past. Many stock owners in the anthrax districts make a practice of vaccinating their animals as a preventive measure and where any losses occur in a neighborhood owners in the vicinity generally proceed to vaccinate. When this vaccination becomes the rule and owners realize the importance of the immediate and thorough destruction of carcasses, losses from this disease will be very materially decreased.

Some losses have occurred from hemorrhagic septicemia but not sufficient to be of consequence.

Some losses have occurred from blackleg, but stockmen generally are aware that there is no occasion for any loss from this disease if they will avail themselves of the improved system of vaccinating and most of them are doing it, and as a consequence losses are very materially lessened.

During the past season very serious losses have occurred in various sections of the state, particularly in the Arkansas valley from a disease commonly designated as the "Kansas horse disease." This condition has been carefully and thoroughly studied by the authorities of this and adjoining states as well as by representatives of the Bureau of Animal Industry, but no definite conclusion has been reached as to its cause. It prevailed for about three months and caused a loss of approximately one thousand horses and mules. It affected both horses and mules of all ages kept under any and all conditions and unfortunately we are apparently no better able to treat or combat a future outbreak, if one should occur, than we were before. There is practically no glanders in the state, only three cases having been condemned during the past year.

Sheep scab still exists in some sections of the state, but both the government and state are working toward its eradication and with the co-operation of the sheep owners, which we are receiving, it should soon be eradicated.

Hog cholera has been much less prevalent than in some former years. The government has one man in the state engaged in hog cholera eradication and great benefit has resulted. Vaccination is quite generally practiced in infected districts, the swine owner realizing the necessity of such practice. In several districts where the disease has made its appearance the farmers have formed associations and employed veterinarians to protect their live stock. One association now employs three veterinarians on salary and three associations employ one each. This
practice seems to give good satisfaction and other associations are under contemplation.

Considerable loss occurs annually among sheep in feed lots, in some cases a loss as high as 10 per cent occurring. The cause of this trouble is not yet thoroughly understood. Some consider the loss due to feeding conditions, others to hemorrhagic septicemia. Experiments are being conducted to determine the exact cause and if that can be determined and remedied it will be of great benefit to the sheep-feeding industry in the state.

CHAS. G. LAMB,
State Veterinarian.

Florida

The general health of the live stock of Florida is excellent. Hog cholera is probably under better control than it has been for several years past. The demand for preventive treatment is far beyond our force of competent veterinarians. The state furnishes, free, fifty per cent of the cost of serum up to 1,500 c. c. and all above that amount at cost. The last legislature made an appropriation of $200,000.00 for the purchase of serum and virus.

The requests from the dairy and cattle men for the eradication of bovine tuberculosis are far beyond our expectation. At the present time, the state is employing six veterinarians who are working exclusively on tuberculosis eradication and we hope to have as many inspectors from the Bureau of Animal Industry as soon as appropriations have been adjusted.

Tick eradication, as we know, is a slow proposition when first commenced in any state, but it is gaining in popularity with the cattlemen to such an extent that demands are being made by a great many of the counties that systematic work be started within their boundaries.

We are now working on the county-group plan, the counties being so situated that reinfestation can be controlled by natural boundaries and otherwise, pending the passage of a state-wide tick eradication law, which is sure to come in 1921.

That Florida is to become one of the leading live stock states in a very few years is evinced by the number of good cattle and hogs that are being shipped into the state. The live stock exhibits at the Florida State Fair, now in session, while possibly not so large, are as creditable as will be seen in any state fair in the country.

Nebraska

ENFORCEMENT AND INVESTIGATION.

Tuberculosis Eradication

Co-operative, Herds or Groups tested.............................................. 269
Total Groups Tested in the State.................................................. 2,345
Total No. of Animals Tested....................................................... 8,312
No. Reactors .................................................................................. 1,111
Indemnity Paid .............................................................................. $3,874.01
Total No. Herds Accredited............................................................. 9
Total No. Herds under supervision.................................................. 208
No. Herds, 1st test pending.............................................................. 65
Average percentage of reactors under the co-operative testing........ 6.2%
Average percentage of reactors in private testing, including dairy work........................................ 5.6%
**U. S. LIVE STOCK ASSOCIATION**

*Special Investigation*

<table>
<thead>
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<tbody>
<tr>
<td>No. Cases Investigated</td>
<td>653</td>
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<tr>
<td>No. New Outbreaks of Disease</td>
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<tr>
<td>No. Quarantines issued</td>
<td>625</td>
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<tr>
<td>No. Quarantines released</td>
<td>634</td>
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<tr>
<td>No. Specimens examined</td>
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**New Outbreaks of disease consisting of the following:**

**Anthrax**

- Number outbreaks, herds: 46
- Total number animals quarantined including horses, cattle, and swine: 2,149
- Of which 2,091 were cattle.
- Total number died: 74
- Length of time involved in checking the outbreak, approximately 5 weeks.

**Lip and Leg Ulceration**

One outbreak in sheep, losses not available to date but not very high.

**Rabies**

Three outbreaks. Total number deaths: 13 cattle, 6 dogs.

**Infectious Pneumonia**

Of Swine exhibited at the Nebraska State Fair

- No. of groups or herds: 266
- No. of swine: 2,279
- Total number deaths: 18
- Nine of which were non-vaccinated hogs which developed cholera evidently picking up the infection in transit on returning from the Fair.

**Meaty Beef**

Six herds, 146 head shipped to market out of which 52 were affected, two condemned.

Forage poisoning in horses simulating the so-called Kansas Horse Plague.

About 15 small outbreaks in western part of state. No definite report on losses yet received.

*Sanitation and Disinfection*

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<tr>
<td>No. Disinfections</td>
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<tr>
<td>(a) Premises</td>
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<td>(b) Stockyards</td>
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<td>(c) Cars</td>
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**Exports**

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<tr>
<td>No. Animals Inspected (all classes)</td>
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**Imports**

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<tr>
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<tr>
<td>No. Quarantines issued</td>
<td>2,315</td>
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<tr>
<td>No. Quarantines Released</td>
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*Accurate only since July 1st.
*Approximately.*
Quarantines issued by this department consist of 21 day quarantines on hogs not vaccinated coming in under special permits or those which are shipped in immediately following vaccination under government supervision.

Sixty day quarantine on all purebred cattle.

Grazing and feeding period quarantine on cows and bulls brought in on affidavit that they will be used for that purpose only.

A few special quarantines on miscellaneous imports requiring such.

**Hog Cholera Control**

- Inspections made: 81
- No. Vaccinations reported, Herds: 1,184
- No. Vaccinations reported, hogs: 49,797

Only such work as conducted under supervision of state and federal veterinarians is here reported.

**Glanders Eradication**

- No. Investigations: 5
- No. affected: 3
- Indemnity Paid: $342.99
- No. Mallein Tests: 7,333

**Scabies Eradication**

- Herds Inspected: 1,005
- No. Animals Infested: 78,062
- No. Animals Dipped, 1st, 2nd, 3rd: 118,237

**Stallion Inspection**

- No. Inspected: 404
- No. Passed: 384

**Sera and Biological Control**

- No. Permits Issued: 21

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**Indiana**

With the enactment of a law creating a live stock sanitary board, and a veterinary examining board, providing for the appointment of a state veterinarian, prescribing the powers and duties of such officials, and furnishing adequate financial support to their activities, in the General Assembly of Indiana, in the regular session of 1919, the cause of “More and Better Live Stock” was given a decided impetus and the industry, as well as the state administration thereof, took a decided step forward. The encouragement given the work of controlling and eliminating diseases among the domestic animals of the state, as a direct result of this measure, is of inestimable value. It promises to afford a simple and direct means of preventing communicable diseases that have caused live stock breeders and feeders heavy financial losses, to serve as a deterrent to epidemics that have made the business precarious, and at the same time to add immeasurably to the agricultural wealth of the state.
The General Assembly wisely provided that the state live stock sanitary board should consist of four members, to be appointed by the governor, of whom two must be reputable veterinarians who are graduates of a recognized veterinary college, have licenses to practice veterinary medicine or surgery in the state and have had not less than three years of practical experience; and the other two members shall be experienced and successful raisers of live stock, actually engaged in live stock production during their period of service as members of the board.

The members of the board serve without compensation, but are allowed traveling and other necessary expenses incurred in the discharge of their duties.

Although the Indiana Live Stock Sanitary Board has been in existence but a short time, relatively, it has already served to bring about a greater measure of efficiency in the work of the department, by effecting a closer co-operation between the live stock men and their interests and the veterinarians. The regulations of the department backed by representatives of the live stock interests, give a prestige that will go far toward solving the problems of the industry and meeting its needs.

A conspicuous provision of the new law is that which says the Sanitary Board shall, from time to time, establish such rules and regulations as may be necessary "to secure the prevention, control and suppression of any and all dangerous, contagious, communicable or infectious diseases peculiar to domestic animals and to prescribe the construction and provide for the operation of rendering plants for the disposal of dead animals, and such rules and regulations, when promulgated as hereinafter provided, shall have the force and effect of law." The board is empowered to adopt such regulations as it sees fit, under this section of the statute, which when approved by a majority of its membership and attested by the secretary, and one copy deposited with the clerk of each circuit court in the state in pamphlet or leaf form, become a part of the statutes, and enforceable as such.

**Regulations to Control Infection**

In line with the authority above referred to, the board at its second meeting on July 22nd, 1919, adopted a series of important regulations, directed toward the control of infection among live stock.

The points covered included regulations covering the conveyances to be used for transporting live stock over public highways; tuberculin testing of pure-bred cattle for intrastate and interstate shipment; regulations governing accredited tuberculosis-free herds; control of rabies; reporting of infectious diseases of animals.

The Board, at this meeting on July 22nd, 1919, also approved a recommendation that the cleaning of stock cars as now required by law, be suspended except as ordered by and cleaned under supervision of the Bureau of Animal Industry or the State Veterinary Department, until such time as the Legislature can amend the law.

**Testing Cattle For Tuberculosis**

The testing of cattle for the eradication of tuberculosis under the accredited herd plan is daily growing more popular in Indiana. There are now 271 herds in the state under the supervision and observation of the state and federal representatives. More applications are being received by the department than can be handled expeditiously. There are now seven federal inspectors at work in the state, under the direc-
tion of Dr. J. E. Gibson, who is in charge of the work for the B. A. I., co-operating with the state veterinary department. Arrangements are being made by the state veterinarian to devote more time and increased facilities to this work, which is based upon the agreement of the live stock owner to permit his entire herd or any part of it to be tuberculin tested at such times as the state and federal officials consider necessary; to slaughter animals showing evidence of the disease; to isolate all suspected of being infected; take precautions against infection in breeding; use only pasteurized milk coming from cows that react to the test; quarantine the herd against possible infection from association with diseased animals and maintain clean and disinfected quarters; and abide by the rules and regulations of the Bureau of Animal Industry and the State Veterinarian in reference to tuberculosis-free cattle. The names of thirty-five owners of fully accredited herds have been published by the State Veterinarian.

Stock buyers who represent the large buying and shipping interests are aware of the prevalence of diseases, especially tuberculosis, among cattle. This is why the Indiana farmer and live stock feeder and breeder have a direct economic interest in the success of this campaign. For years the big packing interests have been observing the character of the live stock purchased in various parts of the country. They have zoned the infected districts and shun those places from which a large proportion of diseased and edibly unfit cattle have come to their stockyards. Under the federal law the condemnations because of infections in cattle represent large sums. It is clear why they should avoid altogether such sections of the country as manifest no interest in the healthfulness of their live stock, or if compelled by market considerations to buy there, why they offer a price within the margins of safety. This may account for the wide variation of prices at many shipping points and it is to avoid discrimination against Indiana farmers and producers that the department is making a determined drive against tuberculosis in cattle. A few years ago the percentage of tuberculosis in all Indiana cattle was 12. Legislation directed to the purification and standardization of the milk supply has reduced this figure in a few years to 2.2 per cent for dairy cattle as compared with 3.6 per cent in beef cattle. These figures have genuine financial significance to the live stock man and they account in a large measure for the co-operation he is extending to the campaign for the eradication of tuberculosis.

Under the accredited herd plan, and for the purpose of encouraging steps to eliminate tuberculosis from among live stock, the Indiana General Assembly of 1919 provided to supplement the sum paid by the federal government for the killing of all reactors identified by the tuberculin test. The federal government pays not to exceed $50.00 for pure-bred cattle and $25.00 for grade cattle slaughtered because of infection and the state will pay up to $80.00 on pure-bred and $40.00 on grade cattle. From June, 1919, until September 30, a total of $4,358.43 was paid out on this account.

Improvement of Rendering Plants

A special effort has been made during the past few months, by the state veterinary department to improve conditions surrounding rendering plants in Indiana, for the purpose of protecting and encouraging those operators who were making a consistent effort to observe the state laws and regulations.
During the 1919 session of the General Assembly, a law was passed amending the hog cholera prevention statutes, providing that no place shall be deemed a suitable or sanitary place for disposing of the bodies of dead animals unless it conforms to the strict specifications issued by the state.

Appropriate penalties are provided for violations of this law, which it is believed, will serve effectively to stop the business of the renegade skinner of animals, who not only violates the laws of the state, but contributes to the menace of infectious diseases.

There are in Indiana 110 plants, an increase of five over those reporting in 1918, devoted to the business of rendering dead animals. These plants paid during the current fiscal year, to the state in license fees, $5,400, a gain of $750 over the previous year.

**Laboratories Serve Industry**

With the enlargement of the veterinary department along other lines the live stock industry and the veterinary profession have taken advantage of the laboratories established for the convenience and use of all who desire to assist in the work of controlling infection among live stock. Dr. John D. McLeay, who is recognized as one of the leading bacteriologists of the Middle West, who is also professor of bacteriology and pathology in the Indiana Veterinary College, is in charge of the department's laboratories.

As soon as specimens are received at the office of the state veterinarian they are turned over to Dr. McLeay. He has taken prompt care of them and made his analyses with a minimum of cost, such as would have been impossible under any other arrangement. The live stock interests of the state as well as the Veterinary Department are to be congratulated upon having such a laboratory and such efficient service at their command.

**Helping Solve Reconstruction Problems**

With the termination of the World War reconstruction and readjustment have many perplexing questions, scientific and economic, which the Department is undertaking to solve for the benefit of the state, and of the live stock breeders and feeders especially.

At least three meetings per week are being arranged for those interested with a representative either of the United States Department of Agriculture, Bureau of Animal Industry, or the State Veterinary Department, with which these field men are cooperating.

A feature of the law creating the Indiana State Live Stock Sanitary Board is that which established also the new State Board of Veterinary Medical Examiners. Under the new order the expenses of each examination are paid out of the appropriation set aside for the Indiana Live Stock Sanitary Board, and all fees collected under the law, from practicing veterinarians for registration as well as from candidates for license and examination, are turned directly into the State Treasury and become a part of the general fund. It is estimated that the examination will be conducted at an expense of about $60 and this will yield approximately $1,000 net to the state.
Summary

With the assistance furnished by the Federal Bureau of Animal Industry and the increased force in this department, the work in controlling hog cholera has been very gratifying, as the reports show less than thirty per thousand having died of this disease.

The work of tuberculosis eradication as our part of the nation-wide movement has increased the work to a degree only limited by the number of assistants. Rabies has given the department more trouble than in many years, there having been outbreaks in different parts of the state, which have caused a great amount of laboratory work, as well as field investigation.

Sheep scabies has been practically eliminated from Indiana. However, feeding sheep which have been shipped from western stock yards are continually breaking, but native sheep are practically clean.

Hemorrhagic septicemia, or shipping fever in cattle, has been reduced 25 per cent over feeders shipped into the state or through public stock yards one year ago, due to the fact that a great many cattle are being treated at destination.

Other contagious diseases are being handled with our district representatives through a two-hour service by telephone, which is giving much better satisfaction than the old system of sending an assistant direct from the Indianapolis office.

L. E. Northrup,
State Veterinarian.

Kentucky

Blackleg has been peculiarly prevalent in the state, breaking out in outlying districts at irregular intervals, and seemingly spontaneously, as none had been reported from such districts in the past. The means of infection have not been determined. No very serious losses followed, as prompt vaccination checked it in each instance.

Hemorrhagic septicemia in cattle is less prevalent than in the past three or four years. Early use of bacterins, etc., has proved satisfactory.

A few outbreaks have been reported in sheep, but spread of the disease has been checked by the generous use of bacterins.

We, of course, have had our troubles with swine diseases, cholera, hemorrhagic septicemia, mixed infection, etc., but not to such an extent as to cause undue alarm or result in very heavy losses. In fact, present conditions are better than at any time since 1910, and we are able to say that Kentucky is increasing her production.

One outbreak of glanders in one of the counties in Western Kentucky caused us some worry, but with the assistance of a local veterinarian, all exposed animals were tested and the three reactors were destroyed. Postmortem showed characteristic lesions.

A marked improvement in sanitary conditions around stables, barns, barn lots, hog pens, etc., has been noticed by all of our field men, and it is reasonable to believe that this has had its effect in producing notable improvement in general conditions.

Co-operative tuberculosis eradication is now our most important work and taxes our forces to the limit. Comparing results in Kentucky with other states, we are extremely well pleased. Following is a summary of our co-operative work since May, 1918.
Amount of indemnities paid to date, $25,813.02.

S. F. MUSSELMAN,
State Veterinarian.

### Louisiana

Live stock conditions generally, during the past year, have been extremely satisfactory, there having been no serious outbreaks of contagious or communicable diseases.

Hog cholera during the past season has been prevalent throughout several sections of the state, but the number of herds involved and character of the animals so affected, range hogs in the majority, is still below the average percentage of two years ago. Far more trouble has been encountered, as results of investigations, from mixed infection and parasitic infestation than from hog cholera.

For the first time in twenty years the state has been remarkably free from anthrax. With the exception of a number of sporadic cases we have investigated, but five outbreaks of any importance were observed.

Due to a protracted rainy season, extending over a period of approximately eight months, extensive infestations of stomach worms (*Hemonchus contortus*) in cattle and sheep have been very general. Never before in our experience of the past twelve years in sanitary control work, have we encountered such general parasitic infestation of every character as we have been called upon to investigate this summer. Without doubt the extensive wet spell referred to is responsible for these conditions. Perpetually soaked ranges and pastures have provided ideal conditions for rapid hatching of parasitic eggs and activity of larvae.

Tick eradication, in view of the many difficulties encountered, has progressed satisfactorily throughout the territory under supervision this year. On December 1st there will be released from quarantine an additional 8,932 square miles. This leaves a territory remaining of about 6,000 square miles to finish up next year in order to complete the job. The development of the cattle industry during the past year, following tick eradication efforts, has been indeed remarkable, and there is no doubt that during the next several years, with continued importation of pure-bred and high-grade cattle, our state is going to be on the map as a cattle-producing center.

Since January 1st of the current year, there have been shipped into the state from territory above the quarantine line 3,470 pure-bred and high-grade dairy cattle, and 680 pure-bred bulls, heifers, and cows of the various beef strains.

E. PEGRAM FLOWER,
Secretary and Executive Officer,
Live Stock Sanitary Board.
Massachusetts

Cattle

Statistics as to the number of neat cattle in this state are available for a period covering about fifty years, and a study of these statistics is of considerable interest.

We find that from the year 1970 to about 1900 there was a gradual increase in numbers. Whereas from the year 1900 to 1918 these numbers have gradually decreased until at the present time we have a number representing an average for the entire period. There have been occasional fluctuations from one year to another during this period, the high mark being reached at or about 1900.

During this period we find that the human population has increased some two and one-half times, and comparing the human population with the number of dairy cows we find that whereas in 1870 there was in Massachusetts one dairy cow to about nine people, in the year 1915 we had only one dairy cow to about 25 people. As the statistics for the entire country I believe show about one dairy cow to four and one-half people these figures show that Massachusetts is away below the average of dairy cows per capita for the entire country. The state is therefore dependent in a fast increasing ratio on other portions of the country for its dairy products. The only way in which live stock has increased is in its money value.

Referring to the prevalence of contagious diseases of bovine animals in the state, we find that the number of cases of tuberculosis has been cut in two during the last ten years. Whereas in 1909 approximately 2,000 head of tubercular cattle were killed in Massachusetts, in 1918 only about 1,000 reactors were destroyed, this notwithstanding more active work had been done in the examination of herds for tuberculosis.

With the exception of contagious or infectious abortion, the prevalence of contagious diseases of cattle other than tuberculosis is insignificant. We have a few cases of anthrax every year, also blackleg and hemorrhagic septicema. No extensive outbreaks of these diseases, however, have occurred in recent years, due in some measure probably to preventive inoculation which is applied. Contagious or infectious abortion, however, is very prevalent among our herds, but statistics regarding the numbers of cases are not available. We are depending upon the private veterinarian for control of this troublesome affection and its correlating conditions.

Horses

The number of horses is rapidly decreasing in the cities and towns of the state. Massachusetts has never been very extensively engaged in the breeding of horses, except at one time in its history when it occupied quite a prominent place in the raising of pure-bred trotting horses.

Glanders is the only disease among horses which has been of extended prevalence, and during the last six years the number of cases found has rapidly declined, having been reduced in that period from approximately 1,100 cases in 1913 to about 30 cases in 1919. This satisfactory condition has undoubtedly been brought about by different methods of control installed about six years ago, the success of which has in a great measure been due to the availability of the different tests now used as a means of diagnosis.
Swine

This class of animals has rapidly increased in Massachusetts since it has been possible to protect herds against the prevalence of hog cholera and in some measure also as a result of a patriotic effort during the war to increase the number of food-producing animals raised.

At the present time about 50 per cent of all the swine in the state are inoculated for hog cholera and other diseases which have of late seemed to be so increasingly prevalent. All hog cholera control work is done under the supervision of the Department of Animal Industry and its regularly employed agents. By its operation garbage feeding in the vicinities of cities and large towns has been made safe, and the majority of swine in Massachusetts are raised on that feed. There is, however, a rapidly increasing production of pure-bred swine, and in this particular branch of the industry garbage feeding is not extensively practiced.

Sheep

We are glad to notice a considerable increase in the number of sheep raised in Massachusetts. For this class of animals we have thousands of acres of good feeding ground which for many years has been going to waste. Proper attention is now being directed to the control of the sheep-killing dog which has been one of the principal drawbacks to the successful raising of this class of animals in this state.

Inspectors of Animals

Massachusetts has a live stock sanitary organization which is probably peculiar to itself and which is of very great aid in carrying out the work of control and eradication of contagious diseases among animals.

Every city and town in the state has one or more so-called inspectors of animals, who are municipal officials appointed and paid by the local municipal government but subject to the approval of the Commissioner of Animal Industry and also subject to his orders.

The existence of an inspector in every municipality of the state who is interested in live stock conditions of his own community and who is subject to the orders of the state official having supreme charge of control work, makes possible the prompt gathering of accurate information and the prompt execution of such detail work as may be sent to him.

As a factor in the successful handling of disease control work by the state and the bettering of the sanitary conditions of premises where live stock is kept, this system has by many years of trial proved itself to be of great value.

Lester Howard,
Commissioner of Department of Animal Industry.

Maryland

During the past two years Maryland has been comparatively free from any serious outbreaks of infectious disease, with the exception of hog cholera, which, during the summer of 1919 was rather prevalent in certain sections of the state. However, owing to the efficient work of the federal veterinarians co-operating with the state authorities, the disease was kept under control and rarely spread to other premises.
than those originally infected after the cases were reported to the inspector in charge. In no instance did the disease show any evidence of becoming epidemic.

It is interesting to note that in the case of new outbreaks where it was possible to trace the sources of infection it was found that 40 per cent were caused by the feeding of garbage and that about 33 per cent were due to the introduction of new stock.

In October, 1918, co-operative tuberculosis eradication work was undertaken under the accredited herd plan and has progressed most satisfactorily. At present we have 29 fully accredited herds and 379 herds under supervision with a view to becoming accredited.

Rabies has been somewhat prevalent, and it became necessary to quarantine four counties and the city of Baltimore on account of the disease.

Anthrax and blackleg appeared in a few isolated areas but were kept under control without difficulty.

R. C. Reed,
Chief, Animal Industry.

Michigan

The condition of the live stock in Michigan for the past year, taken as a whole, has been very satisfactory. Outbreaks of contagious and infectious diseases have been reported frequently from different counties; but as a rule, the losses from these diseases have been light, owing to the fact that our local veterinarians are very prompt in reporting such cases.

Tuberculosis

In the last ten months, there have been tuberculin-tested, 22,000 head of cattle, 13,000 of these being tested by local veterinarians and 9,000 by state and federal men. The percentage of reactors for those tested by the local men was approximately 7½ per cent, as against 3 per cent reactions by state and federal veterinarians, making an average of about 6 per cent reactors. The fact that several large herds that have never been tested previous to this year, have been tested out by local veterinarians and found to contain from 60 to 95 per cent of tubercular animals, has made the percentage of reactors in these local tests much higher than the average. Among the herds that are being tested for the state and Federal Accredited Herd List, we notice marked improvement within the last year. A number of herds that showed a moderate percentage of tuberculosis eighteen months ago are now passing comparatively clear tests. This is very encouraging to the breeders as well as to the officials of the state and federal governments, showing that we are making progress in the control of this disease.

The live stock interests of the state are alive to the fact that the eradication of tuberculosis from their herds is possible, and it certainly will be profitable in the end, although it may imply a comparative financial loss at the time, which is far more than overbalanced by the prospect of a clean herd.

Hemorrhagic Septicemia

This disease leads among the acute infectious diseases, including some local outbreaks and a number of cases of stockyards-infected cattle.
of which, within the last month, there have been a number of cases reported and investigated. I believe that steps should be taken to try to curtail this destructive disease by a proper course of inspection and disinfection at the stockyards, as, within the last few weeks, a number of purchasers of feeders have had the misfortune to lose cattle in this way.

**Anthrax**

In regard to this disease, I am happy to state that we have not had a single outbreak reported to us during the whole year.

**Blackleg**

We have had five or six outbreaks of blackleg within the last year, but no very heavy losses, as we have advised the segregation and vaccination of healthy animals immediately an outbreak is reported.

**Glanders**

Our state appears at the present time to be almost entirely free from glanders. With the exception of Camp Custer, we have had less than half a dozen isolated cases reported.

**Hog Cholera**

This disease has been more prevalent than in 1917 and 1918. As a rule, the outbreaks have been quickly placed under control so that the financial loss has not been extremely heavy. We find, occasionally, an outbreak in feeder hogs that have been taken from the stockyards and have been double-treated before they were removed; but for some unaccountable reason, perhaps through careless handling and improper carrying out of the quarantine regulations, considerable loss has occurred.

**Rabies**

We have had considerable rabies in our state within the last year, which we are keeping under control to a great extent by local quarantines, although in these cases the parties interested and local health officers have not been as prompt as they should have been in reporting this disease. However, at the present time, we believe we have the affected localities safely under quarantine so that the disease may be controlled and further spreading avoided.

I believe every outbreak of contagious disease has its advantages in educating the public as well as health officers and those engaged in sanitary work to the necessity for, and advantages of, a rigid and well-enforced quarantine as the first essential in the control of contagious and infectious diseases.

**Mississippi**

Hogs in Mississippi: The Bureau of Crop Estimates gives reports on farm animals only once each year. The data on hogs in Mississippi for the last three reports are as follows:

<table>
<thead>
<tr>
<th></th>
<th>January 1, 1917</th>
<th>January 1, 1918</th>
<th>January 1, 1919</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swine</td>
<td>1,698,000</td>
<td>1,902,000</td>
<td>2,282,000</td>
</tr>
<tr>
<td>Brood Sows</td>
<td>131,000</td>
<td>147,000</td>
<td>150,000</td>
</tr>
</tbody>
</table>

Geo. W. Dunphy,
State Veterinarian.
J. A. Ramey, field agent for the Bureau of Crop Estimates, expressed his conviction that the increase in the number of hogs from January 1, 1919, to January 1, 1920, will be from 8 to 10 per cent.

C. J. Goodell, live stock leader in animal husbandry extension, basing his opinion on replies to a questionnaire sent to county agents, estimates that the increase will be from 15 to 20 per cent. Mr. Goodell reports that the crop of spring pigs this year was 20 per cent greater, but does not believe that the crop of fall pigs will show any increase. This latter condition is a result of short corn crops and a feeling of uncertainty as to next year's prices.

All authorities emphasize the notable increase in the quality of hogs. Mr. Ramey believes that the finer quality of the hogs will yield as great net increase in pork as will the greater quantity of hogs.

Dairying in Mississippi: The progress recorded in the dairying industry challenges attention. The figures given out by the Bureau of Crop Estimates are as follows:

<table>
<thead>
<tr>
<th>Month</th>
<th>January 1, 1917</th>
<th>January 1, 1918</th>
<th>January 1, 1919</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milch Cows</td>
<td>475,000</td>
<td>508,000</td>
<td>549,000</td>
</tr>
</tbody>
</table>

The value of the 41,000 cows added in 1918 is approximately $2,460,000.

The increase in quality of dairy cattle has been even more pronounced than in hogs.

In 1918, according to L. A. Higgins, extension leader in dairying, there were 25 creameries in the state. These manufactured 2,947,948 pounds of butter. The creameries paid the farmers $1,262,870.47. These figures do not include any dairy products, other than those passing through the creameries. Dairy products sold through other channels were valued at $1,000,000.

Beef cattle in Mississippi: The number of beef cattle in Mississippi has not, in the opinion of C. J. Goodell, leader in animal husbandry extension, made any increase during 1919 and may, in fact, show a decrease of between 5 and 10 per cent. The uncertainty in regard to beef prices has been responsible for a discounting of beef production on the part of a great many farmers.

Sheep in Mississippi: The animal husbandry division of the extension forces estimates that there has been in 1919 an increase of 6 per cent in the number of sheep in Mississippi.

Data concerning health of animals:
- Number of quarantined herds: 1304
- Number of accredited herds: 18
- Number of herd owners adopting accredited herd plan: 411
- Number of cattle in herds under accredited herd plan: 6165
- Number of native animals found diseased (T. B.): 60

Increased valuation of land: Director J. R. Ricks of the Mississippi Experiment Station, estimates that within the last three years land values over the state as a whole have increased 100 per cent.

Possible pasturage lands: Of the 30,000,000 acres in the state, not more than 10,000,000 are under cultivation. The other acreage is taken up in pasturage and in waste land. The price of pasture land varies from $10 to $50 an acre.
Animals imported into state:

<table>
<thead>
<tr>
<th>State</th>
<th>Cattle</th>
<th>Mules</th>
<th>Horses</th>
<th>Pigs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>198</td>
<td>310</td>
<td>81</td>
<td>72</td>
</tr>
<tr>
<td>Arkansas</td>
<td>29</td>
<td>55</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>Colorado</td>
<td>0</td>
<td>3</td>
<td>107</td>
<td>55</td>
</tr>
<tr>
<td>Florida</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Georgia</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Iowa</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Indiana</td>
<td>2</td>
<td>146</td>
<td>117</td>
<td>15</td>
</tr>
<tr>
<td>Illinois</td>
<td>82</td>
<td>10,443</td>
<td>14,445</td>
<td>402</td>
</tr>
<tr>
<td>Kansas</td>
<td>1</td>
<td>249</td>
<td>156</td>
<td>0</td>
</tr>
<tr>
<td>Kentucky</td>
<td>98</td>
<td>264</td>
<td>263</td>
<td>32</td>
</tr>
<tr>
<td>Louisiana</td>
<td>43</td>
<td>186</td>
<td>174</td>
<td>62</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Michigan</td>
<td>1</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nebraska</td>
<td>20</td>
<td>95</td>
<td>317</td>
<td>1</td>
</tr>
<tr>
<td>New York</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ohio</td>
<td>92</td>
<td>25</td>
<td>52</td>
<td>0</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>48</td>
<td>253</td>
<td>70</td>
<td>0</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>South Carolina</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Tennessee</td>
<td>735</td>
<td>5,185</td>
<td>4,553</td>
<td>402</td>
</tr>
<tr>
<td>Texas</td>
<td>45</td>
<td>498</td>
<td>599</td>
<td>23</td>
</tr>
<tr>
<td>Utah</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Virginia</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>62</td>
<td>49</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Animals exported from state:

<table>
<thead>
<tr>
<th>Exported</th>
<th>Cattle</th>
<th>Mules</th>
<th>Horses</th>
<th>Pigs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,998</td>
<td>629</td>
<td>516</td>
<td>1,760</td>
</tr>
</tbody>
</table>

Missouri

Good progress has been made in live stock sanitary work during the year. Appropriations for the payment of office expenses, salaries and traveling expenses were more liberal than heretofore. The sum of $50,000, a greater sum than ever before, was appropriated for the payment of indemnity of tuberculous cattle. This sum is to be duplicated by the counties and the whole doubled by the federal government, thereby making a possible $200,000 available for the payment of indemnities during the years 1919 and 1920. The new indemnity law, effective May 13, 1919, is working very satisfactorily. Tuberculosis eradication work, which was slowed up through the past two and a half years on account of lack of indemnity money, is going forward in good shape at this time.

Hog cholera has not prevailed to any extent in any locality in the state where competent veterinarians are available and where the hog raisers are in the habit of calling a veterinarian when danger is threatening. An extremely wet spring in southeast Missouri put the farmers behind with their work so that sick hogs were not looked after as promptly as they should have been. The result was that hog cholera infection got into the numerous drainage ditches in that section and set six counties afire with disease. Through the activities of ten local deputies, who were authorized to investigate outbreaks of hogs at state expense, the cholera has been brought under control and it is hoped that the centers of disease may be largely destroyed before the spring crops of pigs become susceptible.

Slight losses of sheep from stomach worms and cattle from esophagostoma inflatum have been more or less general over the state. There has also been more or less parasitic trouble among goats in south Missouri.

We have lost some hogs forty to sixty days after vaccination. The
trouble has been variously diagnosed as swine plague, mixed infection, etc., and bacterins used, but the losses continued until hogs were re-vaccinated with serum and virus. The conclusion was that dead virus had been used. The indications are that some veterinarians are too careless in handling virus and by letting it get warm, or through some other untoward influence, it dies. The hogs get serum alone and the passive immunity soon runs out. If these serum alone hogs are in an infected community they break with the cholera and if not they live on, with the veterinarian and the owner none the wiser.

D. F. Lucky,
State Veterinarian.

Montana

No new legislation was enacted by the 1919 Legislative Assembly, relative to live stock sanitation, such action not being considered necessary.

There have been no serious outbreaks of any infectious contagious disease in Montana during the past year. Our working year is from December 1 to November 30. All figures given in this report are from December 1, 1918, to November 1, 1919.

No sheep scab exists in Montana at the present time. Lip and leg ulceration in sheep has materially decreased during the past year. No serious outbreaks of lip and leg ulceration in either the simple or venereal form have been reported. During the past season 18 bucks died from blackleg. This diagnosis was confirmed by our laboratory. This is our first report of blackleg in sheep in Montana. In all we have inspected 420,141 sheep, and have dipped 12,761. This work covers inspection of native sheep, and also of importations, and includes inspection for various diseases.

In all we have inspected 250,269 cattle, including inspections for scab, various diseases and tuberculin tests. We tuberculin tested 22,859 cattle, of which 18,863 were dairy cattle. The total number of cattle tested for accredited herds was 6,796. Total reactors to tuberculin test 623. In addition to this we tuberculin tested 1,270 pure-bred animals shipped in, subject to sixty-day retest. Out of this number 16 reacted.

We had two slight outbreaks of anthrax. In the largest outbreak, 7 cattle died. The area was immediately quarantined, water holes fenced, and every precaution taken. No further outbreaks occurred after control measures were adopted.

We tested 7,788 horses for dourine. Of this number 95 reacted.

We mallein tested 837 horses, among which 23 reacted. This does not include mallein tests of horses for exportation. For exportation we inspected and mallein tested 24,744 horses. Of these not one reacted or was found suffering from glanders.

We have had several slight outbreaks of hog cholera in widely separated districts. The evidence tends to confirm the opinion that these general outbreaks were caused by feeding uncooked pork scrapings. In one outbreak the infection was traced to a shipment from a public stock yard. We inspected 2,941 hogs for various diseases and inspected 12,999 hogs for interstate shipment.

Montana is exceptionally well equipped for sanitary control work. We have a separate building, in which is contained a pathologic and
U. S. LIVE STOCK ASSOCIATION

bacteriologic laboratory and a chemical laboratory, animal rooms, our general office, United States Bureau of Animal Industry Office, and the Live Stock Commission, which includes the recorder of marks and brands, Stock Inspectors and Live Stock Detective Offices.

Our co-operation with the United States Bureau of Animal Industry has been practically all that could be desired. The Bureaus' entire work in the state is under the direction of one inspector. This includes tuberculosis eradication, as well as all other live stock sanitary control work.

The federal officers have handled all of the inspection and dipping of cattle on the Indian Reservations, and assisted the state in inspection and dipping cattle off Indian Reservations. They also have blood tested for dourine horses on the Indian Reservations and those adjacent to Indian Reservations. Their work has been admirably handled.

W. J. Butler,
State Veterinary Surgeon.

New Hampshire

Reports of the department for the past three years show a steady increase in the production of domestic animals including cows, oxen, sheep and other neat stock, the only exception being a decline in the production of horses, and it is suggested that farmers might profitably increase their production of horses of the heavy draft types.

The work in the division of animal industry in our department is progressing in a satisfactory manner, except that we are not acquiring sufficient speed to accomplish what we desire.

The work in our fight with anthrax caused by tannery waste passing into one of our rivers which overflows, has been continued with marked success by the department and the carelessness and neglect of the tannery people has been eliminated. We suffered another violent outbreak over a much larger territory during the summer of 1919, because of change in materials used for disinfecting purposes at the tannery where they were using dried hides shipped from China and other East India countries. The experimental work, not yet completed, which has been carried on here will, I believe, be of considerable interest to members of our association when the report is completed.

We also suffered a serious and wide-spread outbreak of blackleg during the seasons of 1918 and 1919, although we have held it more or less in check during the season just past, with less loss than we had a year ago. Very few cases of glanders have been reported and treated through the department.

We had a virulent outbreak of what the veterinarians called sarcotic scabies during the late fall and winter of 1918-1919. The treatment used, however, seemed to have cleared the trouble up. We believe we got the trouble from horses disposed of from one of the large army camps, which caused us a lot of extra work and considerable money. Hog cholera is practically negligible in our state, a few isolated cases being reported and treated.

Tuberculosis is always with us and we are utilizing every agency at hand to fight the scourge. The Federal Bureau has one man located in our state and we are working co-operatively in holding down the spread of this disease, the work being similar to that carried on in other states.
The accredited herd plan is meeting with favor in New Hampshire although we have started in with the work so recently that we have but few herds on the list, yet applications are coming in frequently from our breeders and herd owners. We lack funds to prosecute the work with the dispatch which we might desire, but we feel that as the work goes on it will result satisfactorily. Prejudice on the part of the farmers and cattle men against the methods employed in suppressing tuberculosis is disappearing and we are getting a good response and considerable co-operation on the part of interested parties throughout the state.

New regulations are going into effect covering the interstate shipment of farm animals. Regulations governing pasture cattle will go into effect in the spring of 1920. Heretofore it has been customary to allow these cattle to enter the state for pasture purposes upon a health certificate from a qualified veterinarian based upon physical examination only. New regulations will make it necessary for such cattle to be tuberculin tested and records recorded as in other cases of interstate shipment.

Andrew L. Felker, Commissioner.

New Jersey

Live stock sanitary work and the control of infectious diseases during the year 1919 has progressed favorably. The phases of the work which have received special attention are hog cholera control, also tuberculosis eradication along the lines outlined in the accredited herd plan. There has developed among the more progressive of the breeders a desire to eradicate tuberculosis, and place their herds on a paying basis.

Several isolated outbreaks of blackleg have been reported.

Protective vaccination against anthrax has been successfully carried out in the southern section of the state, where in previous years the disease has caused considerable financial loss.


New York

As introductory information, preliminary to this brief statement of live stock conditions in New York state at the present time, emphasis is placed on the fact that so far as animal diseases are concerned, the activities of the New York State Bureau of Animal Industry are restricted by law to ailments of a communicable nature. The information contained in this statement is based for the most part on records for the fiscal year July 1, 1918, to June 30, 1919. By urging that pure-bred sires be used to the exclusion of the scrub or inferior sire, and in other ways, this bureau is endeavoring to improve the quality and increase the number of horses, cattle, sheep and swine in this state.

Horses

With respect to equine animals we have no alarming conditions to report so far as communicable diseases are concerned. As in the past, we continue to receive reports of glanders, particularly from the larger cities and surrounding area, but the extent to which this disease has existed during the past year, according to our records is relatively small. Most of the cases reported occurred in Greater New York City or the immediate vicinity. The outlook relative to eradication of this disease in
that city is favorable, due, we believe, to the enforcement of glanders restrictions by this department and the enforcement of ordinances by the New York City Health Department, this bureau and the department referred to, working in co-operation.

An increase in the number of cases of glanders, as well as the development of other communicable diseases in equine animals might have been expected, incident to the return of army horses, but thus far no untoward conditions have been reported.

**Cattle**

The prominent feature of this statement with respect to cattle is, necessarily, the adoption and promotion of the accredited herd plan of tuberculosis eradication. Under this plan, which has been in operation in this state for considerably less than two years, approximately 250 herds aggregating approximately 8,500 cattle have been tested and 11 accredited herd certificates have been granted. Sentiment on the part of the breeders of the state in favor of this work, is most pronounced, and applications for tests are coming to us faster than we are able to handle them.

Over 500 physically sound reacting cattle are being retained for their progeny under the segregation system.

During the year about 48,000 cattle were tuberculin tested with the resultant rejection of about 3,500.

The French Commission for Relief exported from New York state about 6,000 cattle, which were tested under federal supervision.

Losses in cattle, due to anthrax, blackleg and septicemia hemorrhagica have been reported. The latter disease has been quite prevalent.

**Sheep**

Scabies in sheep has been reported to this office from the eastern and western sections of the state. In January, 1919, an order was imposed by the Commissioner of Agriculture, requiring that all sheep coming into the state of New York for purposes other than immediate slaughter, shall be held in quarantine until released by him—thus giving opportunity for their examination and for dipping if satisfactory dipping had not already taken place. At this writing an examination of our records indicates that scabies exists on but two farms or premises, and there conditions are reported under proper control, dipping taking place at necessary intervals and proper sanitary precautions being maintained.

**Swine**

About 70 outbreaks of hog cholera and about 1,100 deaths in swine, due to hog cholera or other infectious or communicable swine diseases, have been reported to this office. The use of anti-hog-cholera serum is becoming more and more general.

In concluding, we refer with appreciation, to the co-operation this bureau receives continually from county farm bureau managers and veterinarians throughout the state.

**Nevada**

Conditions as to infectious diseases among Nevada live stock have been, on the whole, very satisfactory during the past year, there having
been no very destructive outbreaks of the acute infections commonly responsible for severe economic losses.

Losses from hog cholera and anthrax have been almost nil, the districts where these diseases are more or less enzootic being now well known and thorough systematic immunization carried on by active cooperation between the stock owners, state officials, and practicing veterinarians.

Blackleg continues to cause some loss, being wide spread throughout the state, so that small outbreaks occur from time to time among unprotected stock. As a better understanding of this disease and the means for its control spreads among live stock men, however, proper vaccination is being more universally carried out and serious losses now seldom occur.

The situation in regard to rabies which was for a time so serious shows marked improvement, deaths among live stock from this cause being greatly decreased. This favorable result is largely due to the marked reduction in the numbers of predatory animals throughout the state, brought about by the systematic campaign for their destruction by the Bureau of Biological Survey and the State Rabies Commission working in co-operation. Most of the stock lost since the disease entered Nevada has been due to the bites of wild animals, the domestic dog and cat inflicting most of their damage on human beings.

The work of eradicating tuberculosis from among the dairy and pure-bred herds on a state-wide basis has been taken up in co-operation with the Bureau of Animal Industry and very encouraging progress is being made, strong support being given to this work by the live stock owners almost without exception—a result probably due in large measure to the very satisfactory provisions made by the last Legislature as to indemnity for reacting animals, all of which are slaughtered and the owners reimbursed to the extent of seventy-five per cent of the appraised value of the stock. The percentage of reactors found, taking the state as a whole, promises to be gratifyingly low, only a few small areas having been found where it was at all high. It is hoped that this disease can be practically suppressed in a few years by thorough work among the dairy herds, as these to a large extent constitute the source of infection for the beef herds and hogs.

What appears to have been an outbreak of infectious equine abortion resulted in the loss of nearly the entire colt crop on a group of ranches in one district last spring. But our attention was not called to the matter till some time had elapsed, so that no definite determination as to the cause could be arrived at.

Infectious abortion of bovines still presents a very difficult problem, no quick, efficient and economical method of controlling it in large herds being available. Work on a small scale among selected dairy herds by means of persistent local treatment and immunization with living B. abortus vaccine previous to breeding shows apparently satisfactory results, but cannot be applied on a large scale.

The hemorrhagic disease of cattle simulating hemorrhagic septicemia, but apparently due to another etiological factor which is still under investigation, has been rather quiescent in districts where most prevalent in recent years, but has caused greater loss in others where it was rather rare previously. Investigational work as to the actual etiology and control of this condition is still under way.

The State Board of Sheep Commissioners reports very satisfactory
conditions among the animals under its supervision. Necrobacillosis is much less prevalent than last year. Losses from malignant edema have been negligible, and no serious outbreaks of other acute infectious diseases have been reported.

Some scabies is still present, but is well under control. Almost none is to be found among what may be termed the native sheep of the state, almost all the infected flocks being found along the western border of the state where the disease has been brought in from badly infected districts adjoining. Additional legislation passed during 1919 has provided the means for preventing such occurrences in the future, and it is expected the entire state will be practically clean inside of another year.

Conditions among poultry show, on the whole, little change. Some losses from fowl cholera continue to occur among all species, but are usually checked by vaccination, the owners in the districts where this disease occurs now being able to recognize it promptly. Contagious epithelioma, or true fowl pox, seems to have disappeared, though the nonspecific "roup"-like conditions still make some trouble. Losses of turkeys from enterohepatitis have been unusually heavy this year in one district, but about normal elsewhere so far as reports show.

EDWARD RECORDS,
Director, State Veterinary Control Service.

North Dakota

With the increasing value of cattle and the activity of various agencies toward the eradication of bovine tuberculosis, we find the application from stock-owners for co-operation in this work is increasing rapidly. During the year ending July 1, 1919, we had tuberculin-tested 14,531 cattle, of which 8,711 were pure bred. Of these, 503 reacted to the test, less than 4 per cent, and 112 herds were classified as state accredited tuberculosis-free herds. We believe the ensuing year will show that this work has increased nearly 100 per cent.

Glanders has ceased to be a menace to the horse industry. During the year 2,472 horses were mallein tested, 148 being destroyed.

Dourine, we believe is practically eradicated; 1,090 head were bled and complement-fixation tested, 19 head destroyed.

Hog cholera prevailed to a greater extent this year than for sometime. While the outbreak has been extensive for this state, it has been confined to seven counties in the southeastern part of the state. In many herds, mixed infections were found to exist; cholera, necrobacillosis and hemorrhagic septicemia being found in the same herd. Vaccination for all diseases was resorted to.

Hemorrhagic septicemia affecting cattle occurred quite extensively. Vaccination apparently was satisfactory in establishing immunity.

Reports of loss from contagious abortion were not so numerous as during the preceding year.

One outbreak of anthrax was found and confined to the original farm; this being the first anthrax occurring in three years.

Blackleg has prevailed to some extent; vaccination being resorted to.

The sheep industry has increased considerably in this state during the past year and but little trouble with diseases has as yet been met with.

N. F. CREWE,
State Veterinarian.
For the first time since livestock sanitation has been carried out in Oregon, anthrax appeared. Several farms in the Snake River valley district of Eastern Oregon were found to harbor this infection. Horses, cattle, and hogs died. The infection was primarily discovered through the infection of a stock owner who had removed a fallen hide. Within some twenty-four hours, several centers of infection had appeared upon his arms. He at once visited a physician and the physician treated his arm for infection and reported the case to our county veterinarian, Dr. A. G. Moore, who advised the doctor that the condition might be anthrax. A report was made to this office and we were quite loath to believe this disease could be present in this district. Specimens were gathered from animals that had died and were buried without a positive diagnosis being made through attempted spore-inoculation of guinea pigs.

The local county veterinarian was requested to send smears and culture material from any animals that might die in the near future, and in the course of a few days the veterinary department of the Oregon Agricultural College advised that positive diagnosis had been made of anthrax infection. The precautionary quarantines were changed to permanent ones and all the animals in the district were submitted to either a simultaneous anthrax vaccination or the spore treatment. The disease was quickly controlled. Before anthrax vaccine had been administered, hemorrhagic septicemia was suspected and attenuated cultures had been administered to one herd. It was interesting to note that the attenuated culture treatment seemed to control the anthrax infection quite as well as the anthrax vaccine, indicating that attenuated cultures of virulent organisms apparently exert a non-specific protection against some of the other diseases that are similar in nature.

Within the past month, anthrax has caused the death of one person in Oregon through infection, presumably introduced by means of a new shaving brush, infection entering the system through a scratch on the face. The fact that infection has apparently resulted in this manner emphasizes the necessity of carefully investigating all diseases that appear to be of an infectious nature. The infection in Eastern Oregon might have had its origin in a somewhat similar manner through direct infection to animals, either bristles, shoes or gloves acting as intermediate carriers.

Tuberculosis continues to be the one disease that is of greatest concern to the stock owners throughout the state. Satisfactory progress is being made through cooperative federal testing. At the present writing, Oregon has nineteen herds in the accredited list and sixty-nine herds once tested without reactors under the accredited herd plan. We have many other herds that are ready for submission to the federal authorities for check testing and admission to the accredited herd rating. We are making it a policy here in Oregon to have the federal authorities check test all herds that are admitted to accredited herd rating. The state authorities prepare the herds for this check testing and, of course, test out the grade herds. We have a compulsory tuberculin test law that is required in connection with the use of dairy animals for raw milk purposes, also, animals offered for public sale and for exhibition purposes at fairs are required to be tuberculin tested before sale or exhibition can be made.

During the past two years, 53,054 animals were given the tuberculin test, the result being 1,477 reactors and 167 classed as suspects. Of the
reactors 1,387 have been slaughtered and 922 passed as fit for meat food purposes and 435 were condemned as being unfit for meat food purposes.

The state now indemnifies owners upon an appraisal basis. As much as $35.00 can be paid by the state and county for grade animals over two years of age; $50 can be paid by the state and county for pure-bred animals over two years of age; approximately half of these amounts are paid for the respective classes between the ages of one and two years. Animals in which no positive lesions of tuberculosis are found upon post mortem examination are indemnified for in amounts of fifty per cent additional to the above.

Tuberculosis of swine is not highly prevalent in Oregon, largely because the number of swine is limited. We have found that the intradermal testing of hogs, using the upper eyelid as a seat of injection, works exceedingly well. Animals which show a reaction present a swollen eyelid, very frequently the eyelid being entirely closed. The hogs will frequently run into the side of the pen on which the injection has been made.

We have made use of the intradermal test and have attempted to follow out a policy of using a follow-up subcutaneous test in herds where any considerable amount of tuberculosis has been found upon use of the intradermal test.

Glanders in horses seems to be on the decline. We find the intradermic mallein test better adapted to use in the dry section of the state, because the drying winds in this district frequently almost obliterate the reaction that takes place when giving the ophthalmic test. The moist or coast district of the state is best adapted for the ophthalmic test because the pus does not dry and much evidence is always at hand when animals react to this test.

Hog cholera has made its appearance only on three occasions. Several of these outbreaks have been closely associated with the mixing of vaccinated hogs with unvaccinated ones.

Sheep scabies has again made its appearance in districts bordering upon some of our neighboring states. Infection has been introduced on two occasions by the bringing in of bucks from neighboring states. We have a compulsory buck-dipping law, but inasmuch as much of our state borders upon a desert region, it is quite difficult to police much of the range district and occasionally undipped bucks have been smuggled into the state.

An outbreak of what appeared to be the so-called "Kansas horse plague" was present this fall in a band of thirty horses. At the time the report was made twenty-three had died, and at the time of investigation, five more were down with but small chance of ultimate recovery. The infection seemed to be confined to one farm although there have been reports of sporadic outbreaks of a similar malady from time to time throughout the past few years.

In the main it may be said the health of live stock in Oregon has been on a par with that of former years. More interest is being shown by breeders and owners of live stock, and the future looks bright for the live stock industry in this state.

William H. Lyle,
State Veterinarian.
The work in connection with abortion disease has been carried on more extensively than in previous years. The Albrechtson treatment has been demonstrated to many practicing veterinarians throughout the state. This work is conducted under three heads: prevention, sanitation and treatment, and the results have been very gratifying. Herd owners realizing the value of the treatment are constantly requesting assistance from our bureau.

Pennsylvania was one of the very first states to adopt the Officially Accredited Herd plan for eradicating tuberculosis. Since April, 1918, 643 herds, comprising 9,978 cattle, have been tuberculin tested under this plan, and 47 herds, comprising 787 cattle, have been accredited; 469 herds comprising 5,484 cattle have passed one successful test. We have a waiting list of 193 herds, comprising 2,864 cattle, which have not been tested.

The new regulations promulgated by the Federal Bureau of Animal Industry governing the handling of interstate cattle were recently adopted. The adoption of these regulations was a step toward bringing about uniformity in interstate live stock requirements and has made it easier for breeders, dealers and transportation company officials to understand our regulations; also has facilitated the movement of live stock interstate.

Hog cholera infection continues about the same as last year. We are using the double treatment on garbage fed hogs and permanently infected premises. We still use the serum alone treatment and vigorous sanitary measures on new centers of infection.

In April of this year a general quarantine was established in 17 counties in which there was considerable hog cholera. This quarantine prohibited the holding of public sales except on permit. Permits were issued only when swine to be offered for sale were bought in districts free from infection, not handled through any public stockyards, and shipped in cleaned and disinfected cars. The general quarantine checked the disease.

Fewer outbreaks of hemorrhagic septicemia have occurred this year. Prompt vaccination seems to have prevented extensive losses.

We had one case of malignant catarrhal fever. This was confined to one herd of cattle and after proper disposal of affected animals and thorough disinfection no further losses were sustained.

An increase in the number of cases of rabies occurred. A strict and systematic enforcement of quarantines caused a decrease in the number of animals and persons bitten.

But one case of scabies was reported during the year. It was traced to an interstate shipment of sheep.

The Bureau is encouraging the breeding of better horses. Our records show a total of 1,273 stallion licenses issued during the year.

T. E. Munce, State Veterinarian.

South Dakota

Owing to unusual drought in some of the neighboring states and a consequent shortage of feed there has been a heavy movement of feeding cattle into South Dakota. This state does not exempt feeding cat-
tle, as such, from the tuberculin test but exempts range cattle from range territory, providing for the shipment of same on permit from this board. Nearly all shipments of cattle from drought-affected areas belonged to the range class and were permitted to come into the state on health certificate only.

South Dakota is making excellent progress in the co-operative tuberculosis eradication work considering the time that the work has been under way. The first herd was accredited June 21, 1919, and there are now 178 herds under supervision. This does not include the small dairy herds tested, supplying milk to the cities of Watertown, Madison and Mibank. Two federal and two state men are regularly employed, devoting their entire time to accredited herd work.

State indemnity is one-half of the appraised valuation, limited to one hundred dollars for pure-breds and fifty dollars for others, the owner receiving all the salvage from the sale of the animal for slaughter. Indemnity is paid only for reactors found in the co-operative work.

Anthrax is more or less prevalent every year in certain parts of South Dakota, but is easily controlled by vaccination and losses are comparatively small.

Cattle scabies which was practically cleaned up in this state two or three years ago has appeared in several areas notwithstanding the rigid requirements for careful clinical inspection on all live stock shipped into this state. In practically all cases the infection has been traced to cattle brought in from other states during the hot summer months when scabies often can not be detected by clinical inspection.

South Dakota has a county dipping vat law and a great many county as well as private dipping vats have been installed during the past year, and a vigorous campaign to get rid of scabies in the affected areas is being conducted and with good results.

The number of cases of glanders reported in the past four years has shown a steady decline. This state may be reported as almost free from this disease.

Five years of intensive work in a few northwest counties where dourine had gained a foot-hold has been most successful and frequent retests show that the disease is almost entirely eradicated.

Hog cholera continues to be a source of serious loss to the farmers of South Dakota. Vaccinating by the simultaneous method is extensively practiced in the hog-raising areas of the state. The 1919 legislature passed an amendment to the live stock laws which permits county agents to use hog cholera virus in their official capacity and permits farmers to use virus on their own hogs on the farms owned or occupied by them, and on advice of the Attorney General, the regulations restricting the use of virus were repealed. This removes practically all the restrictions against the use of hog cholera virus and affords an opportunity to judge what affect the unrestricted use of hog cholera virus will have in controlling the disease.

There have been no serious outbreaks of animal diseases during the year and in general conditions relative to the health of live stock are excellent.

J. E. FELLOWS,
State Veterinarian.

Tennessee

It is gratifying to be able to report that conditions from the standpoint of live stock sanitary control have been very satisfactory during
the past year. We have had occurrences of various infectious diseases, but in each instance where a report was made to our office it was possible to check and overcome the disease with comparatively few additional losses. The live stock industry in Tennessee is undergoing an enormous growth both as to quality and quantity, and with it comes the necessity for greater vigilance in the conduct of control work, which is being met as efficiently as our official resources in men and money will permit. Our legislative body has given due regard to the situation and I am pleased to state that the appropriation made available for the present biennial period to carry on live stock sanitary control work is almost twice the amount that has ever been appropriated before covering a similar period. This has made it possible to undertake and carry on certain lines of work on a much larger scale. Probably the most outstanding piece of work conducted during the past year, has been that on tuberculosis eradication in co-operation with the Federal forces. We have at the present writing 449 herds under official supervision, including 9,386 head of cattle, and out of this number 34 herds are fully accredited. We also have 52 additional herds for which agreements have been signed but which it has not as yet been possible to test on account of the enormous amount of work for our present force.

The year has been characterized by an unusually small amount of hog cholera, which we feel can be accounted for in part, at least, by greater efficiency in the administration and more general use of immunizing agents, coupled with a more conscientious regard for our sanitary regulations. Blackleg and hemorrhagic septicemia occasion a certain amount of loss every year, and we are doing our utmost to impress upon the cattle owner the advisability of protecting their cattle before actual losses have occurred. The warning is being heeded by many and the losses are being considerably reduced.

Tennessee, like practically every other southern state, is suffering considerable loss every winter from internal parasitic diseases, especially in young cattle. The lack of response to any particular line of treatment makes this an exceedingly important problem, and merits serious consideration along investigational lines.

Rabies has occurred in a few counties, the origin of which could be traced to its introduction from neighboring states; however, the enforcement of a muzzling and ninety-day quarantine order covering the infected counties was followed by satisfactory results.

Influenza and glanders have been almost negligible factors during the past year.

I am realizing more and more the importance of familiarizing the live stock owner with the fundamentals of live stock sanitary control work. The educational side of this great problem should not be overlooked.

M. Jacob,
State Veterinarian.

Utah

Live stock conditions in this state are the best we have ever had, and the live stock industry is forging ahead rapidly. This industry is the second largest in the state at the present time. The assessed valuation being $75,000,000, distributed as follows:
Exports for the past two years are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Horses</th>
<th>Mules</th>
<th>Cattle</th>
<th>Hogs</th>
<th>Sheep</th>
<th>Goats</th>
<th>Hogs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1918</td>
<td>282,091</td>
<td>929</td>
<td>18,953</td>
<td>5,275</td>
<td>32,256</td>
<td>100,000</td>
<td></td>
</tr>
<tr>
<td>1919</td>
<td>1,899</td>
<td>103</td>
<td>6,590</td>
<td>15,933</td>
<td>23,604</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>283,990</td>
<td>1,032</td>
<td>25,543</td>
<td>21,208</td>
<td>56,950</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Imports for the past two years are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Horses</th>
<th>Mules</th>
<th>Cattle</th>
<th>Hogs</th>
<th>Sheep</th>
<th>Goats</th>
</tr>
</thead>
<tbody>
<tr>
<td>1918</td>
<td>466</td>
<td>13</td>
<td>2,026</td>
<td>2,220</td>
<td>32,481</td>
<td>41</td>
</tr>
<tr>
<td>1919</td>
<td>242</td>
<td></td>
<td>2,246</td>
<td>352</td>
<td></td>
<td>62</td>
</tr>
<tr>
<td>Total</td>
<td>708</td>
<td>13</td>
<td>4,272</td>
<td>2,572</td>
<td>32,546</td>
<td>41</td>
</tr>
</tbody>
</table>

The above does not include animals exported or imported without health certificates or for immediate slaughter.

Range conditions are very good. August and September rains gave the feed a good start, and early snow has made it possible for live stock to cover the range. Feeding will not be carried on as extensively as in the past. Some parts of Utah have suffered from the drought which caused a shortage of feed. Lambs are being exported on account of shortage of feed, going to eastern and western markets, as feeders.

Contagious and infectious diseases in this state have been reduced to a minimum. Through the co-operation with the Bureau of Animal Industry, we are in a position to eradicate them successfully and rapidly. The following diseases have been the most prevalent during the past season:

**Anthrax.** Four outbreaks occurred in the central part of the state with a loss of four horses and 32 head of dairy cattle. Vaccination of 9,582 prevented any further loss.

**Blackleg.** Through the state the Bureau of Animal Industry distributed 145,000 doses of vaccine, and 75,000 doses of proprietary vaccines were used during 1918, and gratifying results obtained. There was less loss during 1919 than at any previous time.

**Contagious Abortion.** Throughout the state there is very little being done to eradicate this disease. Segregation, use of drift fence, dairying and breeding hygiene is being recommended—biologics not being used or recommended at the present time.

**Glanders.** Seven cases have been found in the past two years; three cases on farms and four in stock yards. The animals were destroyed, the state paying 50 per cent of the actual value. Testing of exposed animals and cleaning and disinfection of premises has kept this disease under control.

**Hog Cholera.** Co-operation with the U. S. Bureau of Animal Industry, and the adoption of the simultaneous method have eradicated hog cholera from this state. Hog production has increased over 100 per cent, and Utah was the first state in the Union to comply with the U. S. food regulation in the increased production of pork.

**Infectious Keratitis.** Prevalent throughout the state—10 per cent of cattle being affected. Very little loss and little blindness.

**Tuberculosis.** Existing in one-tenth of 1 per cent of dairy cattle. The
adoption of the intradermal method of testing is making it possible for us to clean up.

Tested during 1917 and 1918, 36,341; reacted 341. In co-operation with the Bureau of Animal Industry, tested 5,607, reacted 83. Total tested 41,938, reacted 424. During the past six months the State Department has tested 12,521 with 68 reactors. The state pays 50 per cent of the appraised value for destruction of reactors, not to exceed $50.00 for grade one, and $100.00 for pure-bred animals.

Scabies. Utah is clean at the present time. It was necessary to quarantine two neighboring states in order to keep clean. No quarantine exists on Utah sheep.

Utah has spent $72,991.86 for destruction of predatory wild animals and the purchase of 5,168 ounces of strychnin for the extermination of rodents during 1917 and 1918. This has resulted in the destruction of 2,319 coyotes, 367 bobcats, 11 lynx, 2 lions, 232 badgers, 22 wolves and 3 bears. The furs from these animals brought $7,524.70, which amount was credited to the bounty fund. The appropriation has been increased for the following two years to cover $200,000.00, and 50 per cent of the unexpended bounty fund. The Biological Survey is spending $40,000.00 a year in co-operation for the same purpose.

At the present time the State Live Stock Board is co-operating with the U. S. Department of Agriculture in—

Tuberculosis eradication, Scabies, Dr. F. E. Murray in charge.

Hog cholera, Contagious and infectious diseases, Increased hog-production, Dr. R. N. Mead in charge.

Eradication of predatory, wild animals, Dr. E. W. Nelson, chief.

R. W. HOGGAN, State Veterinarian.

Vermont

There are at present in the state 369,484 cattle, 67,653 horses, 49,111 sheep, and 41,115 swine.

No serious losses due to contagious and infectious diseases have been reported to the commissioner's office during the past year. We have had outbreaks of hog cholera and hemorrhagic septicemia in swine, but inasmuch as this is not a large hog state the losses have not been severe. Prompt measures of control were adopted by the use of anti-hog cholera serum in connection with virus with good results. No report has been received of diseases in sheep.

Only two horses were destroyed during the entire year because of glanders. All horses coming into the state must come in upon permit issued by the commissioner of agriculture, and satisfactory health certificates must be received before the animals will be released from quarantine at destination. All horses coming from large cities or sections where glanders is known to exist must be mallein-tested. Hemorrhagic septicemia has been quite prevalent again during the past year among cattle and considerable loss has been experienced in young stock in mountainous sections. Vaccination has been resorted to with good success. Considerable loss has been caused during the past year by blackleg in certain infected areas, and one report was received of anthrax infection in the vicinity of Mt. Mansfield where outbreaks have
occurred in previous years. Contagious abortion still continues to be one of the difficult problems to handle in this state inasmuch as the contagion seems to be quite widespread.

Eradication of tuberculosis under the accredited-herd plan has become very popular in Vermont. About 750 herds are under state and federal supervision and between 700 and 800 new applications are on the waiting list continually. Vermont now has a large list of herds having passed one or more tests without reactors. Almost 50 per cent of the pure-breds in the state are already under state and federal supervision.

A. J. De Fosset,
Deputy Live Stock Commissioner.

Washington

During the past year the state has been fortunate in not having any serious widespread outbreaks of communicable live stock diseases. Five veterinarians are employed as inspectors on full time, each inspector having a district to cover.

Indemnity to the amount of one-third the difference between the appraised value and the salvage received from slaughtered tuberculous cattle is paid to the owner. This compensation is limited to $25.00 for grade cattle and $50.00 for pure-breds. The state co-operates with the Bureau of Animal Industry in this work.

During the past year there has been officially tuberculin-tested 30,164 head of cattle, of which number 941 were reactors, nearly all of which were slaughtered. The percentage of tuberculous cattle is decreasing very rapidly since the widespread use of the intradermal test. The requests for this work are received in greater number than can be handled with promptness.

No case of sheep scab has been found since October, 1918, when a quarantine was established in Okanogan County and 60,000 sheep dipped.

Hog cholera has made its appearance in a few localities, but in each case was confined to the farm on which the disease was found. Most outbreaks occurred on the premises of garbage feeders.

Blackleg occurs throughout the state. The spore vaccine produced by the U. S. B. A. I. is in general use and has given satisfactory results.

A few cases of rabies have been reported. Quarantines have been issued when the disease is known to have been spread.

Nearly all of the few cases of glanders found were located in south-eastern Washington. Suspected herds of horses are tested and the reactors destroyed. No indemnity is paid.

Hemorrhagic septicemia occurs from time to time in the western part of the state, but is not general.

Abortion disease is present throughout the entire state. A bill requiring that the owner of cattle offered for sale at public auction should make an affidavit relative to the prevalence, or absence of, abortion disease in his herd failed at the last session of the legislature.

We have been assisted in our work by the United States Bureau of Animal Industry.

R. J. Donohue,
Chief, Division of Dairy and Livestock,
Washington State Department of Agriculture.
Canada

It is a rather remarkable fact that in view of the war wastage the number of horses and cattle in Canada for the present year constitute the highest on record in our history. Sheep have shown a very satisfactory increase, and we have during the past year the highest number on record since Confederation. Swine, however, have shown a decrease. The following table gives the exact figures as reported by the Statistical Branch of the Trade and Commerce Department:

<table>
<thead>
<tr>
<th>Animal</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horses</td>
<td>3,667,369</td>
</tr>
<tr>
<td>Mules</td>
<td>15,102</td>
</tr>
<tr>
<td>Milk cows</td>
<td>3,547,437</td>
</tr>
<tr>
<td>Other cattle</td>
<td>6,536,574</td>
</tr>
<tr>
<td>Sheep</td>
<td>4,040,070</td>
</tr>
</tbody>
</table>

It is very gratifying to report that, although it is natural to expect an increase in contagious diseases of animals after a great war, up to the present time no serious epizootics of any kind have occurred in Canada. We have not had any cases of sheep scab, nor horse mange, and only a very few outbreaks of glanders, which have occurred in the Province of Manitoba, and which appear to have been brought in from an old infected district in Saskatchewan. I am glad to be able to say that dourine has been eradicated. Only a few suspected cases were found last year, and, although a very large number of complement-fixation tests have been made of serum from horses in the old infected district, no positive reaction was obtained. It is our intention, however, to still continue making these tests of breeding animals for some time as the Department does not care to be confronted with another outbreak of this malady.

Our work in dealing with mange in the old mange infected area is progressing satisfactorily. We have been able during the past year to release quite a large area from this territory. We are taking very special measures to ascertain definitely to what extent this disease exists in the restricted area, and it is our intention to enforce a compulsory dipping measure next season in all areas where the disease is detected. A special force of officers will be drafted into the area to enforce our requirements, and in order to facilitate this work, it is our intention to remove from this area all suitable territory in which the disease is not found. I am therefore of the opinion that at the end of next season it will be possible to remove the restrictions from this large area even though it may be necessary in some instances to maintain individual quarantines.

We have been exceptionally fortunate with regard to hog cholera. Our losses from this disease have been less than for many years. These outbreaks have been limited to garbage fed hogs.

I mentioned in my last report that owing to outbreaks of this kind, measures had been taken for controlling the feeding of garbage. This material can now only be fed legally under license. Our experience shows that educating garbage feeders with regard to the danger of feeding uncooked garbage gives favorable results. The outbreaks occurring during the past year, with a very few exceptions, have been found on unlicensed premises.

In dealing with outbreaks we are destroying only the hogs showing clinical symptoms. All other contact hogs are promptly injected with serum and the premises thoroughly disinfected. The treated hogs are
slaughtered under official supervision as soon as they are fit for the block. This procedure has given very good results, few hogs having died after treatment.

Owing to the fact that we have no permanently infected hog-cholera territory in Canada the simultaneous treatment is not in general use. As you are aware, the use of hog cholera virus or serum is absolutely prohibited in Canada, except by our veterinary inspectors. The simultaneous treatment has been used in one or two exceptional cases but is not likely to come into general use under our present conditions.

Anthrax is a disease which is very seldom seen in Canada. We have occasional outbreaks occurring in the same districts, owing to carelessness on the part of owners in neglecting to immunize their animals. Very few outbreaks have, however, occurred during the past year. The importation of foreign hides has not so far increased the prevalence of this disease. We are, however, taking all possible precautions with regard to these hides. All shipments not accompanied by the required certificates are promptly disinfected under the supervision of one of our officers, as well as all contact matter.

Contagious Abortion is still the cause of very serious losses throughout our country, and while, owing to the many difficulties surrounding the control of this disease, no definite steps have been taken with regard to it, we are distributing a live culture of the organism to veterinarians for immunizing purposes. Although our experience has been limited, the use of this culture indicates that it is of value.

Outbreaks of hemorrhagic septicemia occur from time to time but they have all been of a sporadic nature.

Blackleg is also the cause of many fatalities throughout Canada, but it is readily controlled by the use of blackleg vaccine. This vaccine is supplied at cost to stockmen and veterinarians, and in cases where young cattle are systematically vaccinated from year to year, the disease is practically unknown.

We have recently increased our measures with regard to tuberculosis by passing regulations for the establishment and maintenance of tuberculosis-free accredited herds of cattle. Although this work has not actually commenced, we have a large number of breeders desiring to put their herds under this system. I have no doubt, therefore, that this system will come into general use in the very near future.

F. TORRANCE,
Veterinary Director General.
CONSTITUTION

Section 1
This association shall be known as the "United States Live Stock Sanitary Association."

Section 2
The purpose of this association shall be the study of sanitary science, and the dissemination of information and methods pertaining to the control and eradication of infectious diseases amongst live stock.

Section 3
The officers of this association shall be a President, five Vice-Presidents, and a Secretary-Treasurer.

Section 4
The elective officers of the association shall constitute the Executive Committee.

BY-LAWS

Section 1
The duties of the several elective officers shall be those generally performed by such officers in similar organizations.

Section 3
The several officers of the association shall be elected by ballot at each annual meeting and a majority of all votes cast shall be necessary to a choice.

Section 4
The standing committees of the association, in addition to the Executive Committee, shall be a Committee on Publication, Legislation, Finance, Credentials, and Resolutions. They shall each consist of three members who shall be appointed by the president at each annual meeting or as soon thereafter as may be practical.

Section 5
Any person engaged in live stock sanitary work for federal, state, territorial, county or municipal governments shall be eligible to membership in this association, and any other person interested in live stock sanitation may be elected to active membership upon the recommendation of the Executive Committee and a two-thirds vote of the members present.

Section 6
Each application for membership shall be submitted in writing and shall be referred to the Executive Committee for consideration and recommendation of the Association.

Section 7
The revenue of this association shall be derived as follows: Each member shall pay annual dues of two dollars, payable in advance, and shall be entitled to a copy of the annual report upon such payment. Said annual report to be copyrighted.
U. S. LIVE STOCK ASSOCIATION

Section 8

Order of business:

Roll call.
Reading of minutes.
Unfinished business.
President’s address.
Report of Executive Committee.
Reports of Standing Committees.
Reports of Special Committees.
Report of Secretary-Treasurer.
Reading of papers; discussions, etc.
New business.
Election of officers.
Appointment of committees.
Adjournment.

Section 9

The meetings of this association shall be held annually at such time and place as may be designated by the Executive Committee.

Section 10

A suspension of the By-Laws may be made by a two-thirds majority for the purpose of changing the order of business to facilitate important business.

Section 11

All proposals for the alteration of the Constitution and By-Laws shall be submitted in writing, and no alteration shall be acted upon until it has been referred to the Executive Committee and presented anew by them at the next meeting of the association.
PROPOSED AMENDMENTS

Amendments and additions to the constitution and by-laws submitted, to be acted upon at the next meeting.

Amendment to Section 6 of the By-Laws

For “Executive” in this section substitute “Credentials,” making the Section read:

Section 6: Each application for membership shall be submitted in writing and shall be referred to the credentials committee for consideration and recommendation of the association.

Addition to the By-Laws

Section 12: In matters of a purely regulatory nature voting in this association shall be as follows: Each state shall have one vote to be cast by the state’s accredited representative of the Live Stock Sanitary Control Force of the state. The United States Bureau of Animal Industry shall have ten votes to be cast, one by the Chief of the Bureau and one by the Chief of each of the following Divisions of the Bureau: Animal Husbandry Division, Biochemic Division, Dairy Division, Field Inspection Division, Quarantine Division, Tick Eradication Division, Tuberculosis Eradication Division, Zoological Division and Division of Hog-Cholera Control. The National live stock breeds’ association shall have one vote each to be cast by its accredited representative. No state, division of the Bureau of Animal Industry or national live stock breeds association shall be entitled to a vote unless its accredited representative be present when the vote is taken.

Amendment to the Constitution

Section 4: Add to this section: “The first vice president shall be chairman of the Executive Committee.”

Amendments to the By-Laws

Amendment to Section 5 of the By-Laws.

There shall be two classes of membership in the Association, active members and associate members.

Any person in charge or representing live stock sanitary control work in any State, the Chief of the Bureau of Animal Industry, and heads of the various Divisions within the Bureau of Animal Industry and the President or Secretary of all National Live Stock Breeders’ Associations shall, ex-officio, be eligible to active membership.

Any person interested in live stock sanitation may be elected an associate member upon recommendation of the Credentials Committee and a two-thirds vote of the members present.

Only active members shall be eligible as elected officers of the association and a majority of all committees shall be active members of the association.

Section 6: Add the following at the end of this section: “Except as provided in Section 5, applicants recommended for membership by the Executive Committee may be elected by a majority vote. The associa-
tion may, by vote of three-fourths of the members present, direct the Executive Committee to recommend an applicant for membership."

Section 7: To read as follows: "The annual dues shall be $2.00, payable in advance and shall entitle each member to a copy of the annual report of the association. No report shall be supplied to any member whose dues are not paid in advance."

Section 8: Instead of as at present given, to read as follows: "The secretary-treasurer shall, prior to each meeting, publish and send to each member, a program for the meeting, showing the order of business and such order shall not be changed except as provided by Section 10."

Section 11: To read as follows: "All proposals for the alteration of the Constitution and By-Laws of this association shall be submitted in writing, and shall be referred to the Executive Committee of the association. Proposed alterations submitted at any meeting shall not be acted upon by the association until after publication in the annual report; but in emergencies and at the discretion of the president and secretary-treasurer, proposed alterations may be submitted in writing to each member of the association not less than ten days in advance of any annual meeting and acted upon at the succeeding meeting without previous publication in the annual report."
## REGISTER OF ATTENDANCE

<table>
<thead>
<tr>
<th>Name</th>
<th>City, State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alford, S. W.</td>
<td>Lincoln, Neb.</td>
</tr>
<tr>
<td>Anderson, J. S.</td>
<td>Omaha, Neb.</td>
</tr>
<tr>
<td>Anderson, Wm. P.,</td>
<td>Kansas City, Mo.</td>
</tr>
<tr>
<td>Armour, W. J.</td>
<td>Goshen, Ind.</td>
</tr>
<tr>
<td>Atherton, I. K.</td>
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<td>Agricultural College, Miss.</td>
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<td>Chippewa Falls, Wis.</td>
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<td>Craig, W. B.,</td>
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<td>Graham, Ralph,</td>
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<td>Hawkins, F. V.,</td>
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