STATE VETERINARY SURGEON
REPORT OF THE

TWENTY-FIRST
ANNUAL MEETING

of the

UNITED STATES LIVE
STOCK SANITARY
ASSOCIATION

Chicago, December 3, 4, 5, 1917
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OFFICERS AND COMMITTEES—1918

President
M. Jacob, Nashville, Tenn.

Vice-Presidents
A. J. Glover, Ft. Atkinson, Wis.  W. F. Crewe, Bismarck, N. D.
L. H. Howard, Boston, Mass.  A. S. Cooley, Cleveland, Ohio.
Frederick Torrance, Ottawa, Canada.

Secretary-Treasurer
S. H. Ward, St. Paul, Minn.

Finance.
L. N. Northrup, Indianapolis, Ind.

Legislation.
J. I. Gibson, Des Moines, Iowa.

Credentials.
P. F. Bahnsen, Atlanta, Ga.  O. H. Eliason, Madison, Wis.
W. H. Dalrymple, Baton Rouge, La.

Resolutions.
O. E. Dyson, Chicago, Ill.  E. Z. Russell, Omaha, Neb.
E. S. Brigham, St. Albans, Vt.

Program and Publication.
S. H. Ward, St. Paul, Minn.  D. M. Campbell, Chicago, Ill.
J. J. Ferguson, Chicago, Ill.

Tick Eradication.
P. F. Bahnsen, Atlanta, Ga.  R. O. Feeley, Clemson College, S. C.
J. W. DeMilly, Tallahassee, Fla.  E. Pegram Flower, Baton Rouge, La.
Dr. H. Cunningham, Fort Worth, Texas.

Hog Cholera Control
A. L. Hrileman, Atlanta, Ga.  V. A. Moore, Ithaca, N. Y.
Edw. A. Cahill, Boston, Mass.
J. W. Connaway, Columbia, Mo.

Grievances.
S. F. Musselman, Frankfort, Ky.  J. H. McNeil, Trenton, N. J.
J. S. Anderson, Lincoln, Neb.
Advisory Committee to Secretary

E. Pegram Flower, Baton Rouge, La.  J. G. Wills, Albany, N. Y.
   W. J. Butler, Helena, Mont.

Committee on Diseases

C. P. Fitch, St. Paul, Minn.  R. A. Archibald, Oakland, Cal.
J. A. Kiernan, Washington, D. C. Adolph Eichhorn, Pearl River, N. Y.

Infectious Abortion.

G. M. Potter, Manhattan, Kansas.  T. H. Ferguson, Lake Geneva, Wis.
E. S. Bayard, Pittsburg, Pa.
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 2.

The executive committee shall select the place for the meeting of the Association and execute such other duties as the Association shall direct.

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 one dollar, payable in advance. By the sale of the annual reports of the Association at a price to be annually fixed by the committee on publication, said annual report to be copyrighted.

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.
REPORT OF THE PROCEEDINGS

of the

Twenty-First Annual Meeting of
the United States Live Stock
Sanitary Association

Chicago, December 3, 4, 5, 1917

The meeting was called to order at 10 o'clock a.m., December 3, 1917, at Hotel La Salle, Chicago, President J. G. Wills presiding.

PRESIDENT WILLS: The meeting will please come to order. The first order of business is the roll-call.

SECRETARY WARD: Mr. President, in view of the fact that there is quite a large membership, I suggest that the members register at the secretary's office, and that that registration be accepted as the roll-call for the meeting.

PRESIDENT WILLS: The next order of business is the reading of the minutes of the last meeting.

BR. CREWE: I move that the report of the proceedings, as published, be accepted as the minutes of the last meeting.

The motion was second and carried.

PRESIDENT WILLS: Next is the matter of unfinished business. Is there any unfinished business.

SECRETARY WARD: None that I know of, Mr. President.

PRESIDENT WILLS: If not, next in order is the President's address.

PRESIDENT'S ADDRESS

Dr. J. G. Wills, Albany, N. Y.

This meeting, the twenty-first annual gathering of this organization, convenes at a most important period. We have met here to consider questions pertaining to the welfare of animal industry and perhaps shape to some extent the future of this most important branch of agriculture.

We have during the past year been visited by no serious or unusual outbreaks of animal disease which would tend to deplete animal life at a time when most needed. It is indeed fortunate that there has been no such epizootic as the foot and mouth outbreak of three years ago which, at a time like this, would be
particularly serious when every effort of the nation, state and individual is being put forth to aid our country in the great World War.

Now, as never before, is there necessity for reducing in every way possible the losses from infectious disease or other preventable causes. Animal products such as meat, milk, leather and other necessities directly dependent upon domestic animals for their origin have shown as much if not more of an increase in cost than have most other commodities. This is, therefore, a time when the conservation of such resources is very vital to the end that the wants of our own people as well as our allies be supplied.

Much has been said and published relative to encouraging production and increasing the animal population of the country. Unfortunately there has been an apparent lack of attention given to the control of maladies and conditions which destroy animal life from causes which are preventable. The tendency has been to advise and recommend increasing the number of animals raised without due attention to measures for the preservation of animals already existing.

Mortality among food-producing animals can be reduced by various means: Housing in more sanitary surroundings, care in reducing the opportunity for infection, limiting the spread of any and all diseases due to contaminated cars, boats and other transportation conveyances, but principally by the application of more scientific and, therefore, more intelligent measures in the control and eradication of already existing infections.

It is important that there be a better understanding between live stock owners and those engaged in the transportation and distribution of animals. Years ago common carriers exhibited little interest in the protection of live stock entrusted to their care, particularly if for slaughter, as was evidenced by the general use of poorly equipped, unclean and insanitary stock cars, stock pens and yards, failure to properly feed, water and rest live stock and other objectionable features. As a result of these conditions millions of dollars have been lost due to deaths from disease, overcrowding and neglect. Recently there has been a remarkable change of attitude and today transportation companies are devoting more and more attention to these matters. They have assigned specialists to supervise this branch of their business and have manifested a desire to co-operate and assist authorities and animal owners in every way possible and have given special attention to providing satisfactory shipping facilities. It is now the duty of the other interests involved to co-operate and assist in every possible way.
This subject naturally leads to consideration of traffic in live stock and the means whereby cattle, sheep and hogs not for slaughter purposes may be moved from state to state without the restrictions that now prevail, providing of course that necessary precautions to guard against distribution of communicable diseases are in effect. It is unfortunate that under the present system conflicting regulations exist governing the movement of live stock between states. As a result attempts on the part of transportation companies and shippers to comply with regulations not always uniform causes much confusion. It has been suggested that these matters should be under the control of the Federal Government, but constitutionally the states of course have broad powers in regulating domestic commerce within their own borders. Therefore, the only course left is to endeavor to secure uniformity through the enactment of similar state laws and the adoption of like methods by officials having charge of such matters.

As a means to this end in the case of breeding or dairy cattle the accredited tuberculosis free herd plan has been put forward. This is considered as offering a solution so far as it relates to bovines and tuberculosis and may be the forerunner of a general system applying to other species and other diseases. It is hoped that at this meeting it will be possible to make definite plans which will have an important bearing on future live stock movements. It must be understood that this or any other plan, having as its object the control or elimination of an infectious disease, will be successful in almost direct ratio to the interest and intelligence manifested by those most concerned. The tuberculosis problem will be solved only when cattle owners and veterinarians become thoroughly familiar with its characteristics and unite in an earnest desire to effect its extermination. It is time that we recognize the fact that in dealing with diseases well established, chronic in nature and obscure in attack, that we must fight such defensively rather than offensively; that forcible control is not practical or possible and that education and enlightenment are our strongest weapons.

As a means of educating live stock owners it would seem feasible, for example, to print upon (health test) certificates statements setting forth the importance of proper handling of animals in clean and disinfected quarters, the avoidance of contact with animals not known to be healthy and the use of all means and measures to prevent infection being carried to individuals supposed to be free from communicable disease. It should be impressed upon all concerned that the healthy herd is to be sought as the ideal rather than the healthy individual, and that the addition of one infected animal or the failure to guard against any
one channel of infection may be the means of undoing months and years of labor spent in eradicating an infection.

This is a proper time to emphasize the important position which is occupied by the veterinary practitioner and stock owner in the control of preventable animal diseases. Those of us in administrative and official positions may sometimes feel that practicing veterinarians or animal owners do not interest themselves in communicable diseases as much as they should. This is doubtless true in individual cases. On the whole, however, we must rely upon these men, particularly the veterinarian properly trained to advise us of the existence of communicable diseases in live stock in a community. Almost invariably the local practitioner is first called upon for advice and assistance in controlling the malady and later renders valuable assistance in its eradication. Officials in state and national service are responsible for the administrative or regulatory portion of the work, but their success depends very largely upon action already taken by the local practitioner. If he has properly advised his clients, made an accurate diagnosis and instituted proper methods of control, the foundation is laid for future satisfactory work. The ideal combination is an efficient administrative service coupled with the cooperation of skilled practitioners, who in turn impart proper information to their clientele.

At this time I believe it fitting to refer to those of the veterinary profession who have entered the military service and at great sacrifice are rendering loyal and noble aid to the profession and to the country. While the direct necessity of the veterinarian in military operations has apparently become less important in modern warfare, a close study of the situation will indicate otherwise, furthermore better care and more attention is being given to animals in this war than in former wars. While it is not possible at this time to estimate the benefits that will come through the army veterinary corps, we are justified in feeling proud of the men who have offered their services and who will undoubtedly fulfill their duties with credit to themselves, honor to the profession and benefit to the nation.

Let us keep in mind in our deliberations here, that upon this country must largely rest the burden of providing clothing, food and munitions of war for our armies, as well as those of our allies. Agriculture forms the basis of all these with animal industry as one of its most important subdivisions.

Without wool, leather and meat, no nation can long maintain a fighting force. In addition to these direct and immediate necessities, we must consider countless indirect by-products of animal life, many of supreme importance in economic as well as military activities.
While it is perhaps not an opportune time to consider the adoption of new measures or the planning of new enterprises or reforms, at the same time we must make preparations to meet the changed situations which will undoubtedly exist in the future and be alive to the necessity of taking advantage of every means whereby the live stock industry and all attendant pursuits may be aided. Should the present war conditions prevail for any great length of time, it is to America that Europe, as well as possibly Asia, will have to turn for replacement of the domestic animal population depleted through the necessities of war.

Upon the members of this organization must rest much of the responsibility in connection with the formulation and execution of measures that will reduce to a minimum the losses due to infectious diseases. Let us accept the obligation.

PRESIDENT WILLS: Next in order is the report of the Executive Committee. That will be deferred, if there is no objection. In order that the matter may be regularly handled, the Chair will entertain a motion that that be deferred.

The motion was seconded and carried.

PRESIDENT WILLS: Next in order is the report of the secretary-treasurer.

REPORT OF SECRETARY-TREASURER

I am gratified to report that notwithstanding the increased cost in carrying on the work of the Association and presenting its activities to those interested, our funds show a very favorable condition. The report of the proceedings of the last meeting was issued in a manner in keeping with this organization. The cost was double that of previous years and the revenue derived from its sale has been limited by reason of the fact that only about one-half the copies issued have been sold. A very large number of copies are still on hand and it is incomprehensible that with our large membership only about 350 copies have been sold.

The credit for the manner in which this excellent report was published must be given to Dr. D. M. Campbell, chairman of the committee.

The program for this meeting should have been in the hands of the members at least one month before the date set for the meeting, but unfortunately some of the advertising matter was held up, hence the delay.

Mrs. Flaws, your clerical secretary, has rendered most valuable help by reason of her intimate knowledge of the Association affairs and the business methods of my esteemed predecessor, and her re-election is earnestly suggested.
TWENTY-FIRST ANNUAL REPORT

Receipts

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<td>1918 Annual Dues</td>
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Expenses

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<td>Bills receivable</td>
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S. H. WARD, Secretary-Treasurer.

PRESIDENT WILLS: What is your pleasure with this report, gentlemen?

DR. ELIASON: I move that the report be accepted.

The motion was seconded and carried.

PRESIDENT WILLS: Next in order are the reports of the standing committees: Finance, Legislation, Credentials and Resolutions. The chairman of the Finance Committee is Dr. Crewe. Is he ready to report for his committee?

DR. CREWE: Mr. President, we have not prepared a report as yet. According to the program, we thought that would come later.

PRESIDENT WILLS: There was an error in printing the program. They omitted to put in the reports of the standing committees today. The chair will entertain a motion that the by-laws be suspended, until these committees can report after they have an opportunity to meet.

DR. CAMPBELL: Mr. President, I move that the reports of the standing committees be deferred until the committees have an opportunity to meet.

The motion was seconded and carried.

PRESIDENT WILLS: We now come to the report of the Committee on Publication.

REPORT OF THE COMMITTEE ON PUBLICATION

The papers and reports of the committees presented at the twentieth annual meeting of this association, together with a transcript of the stenographic notes of the discussions were turned over to me for publication as a member of the committee on publication, about the middle of January.

Bids on the printing and binding of the report were asked of some of the high class printers in Chicago. The quotation of Kenfield-Leach Co. being slightly lower than that of others, the contract was awarded to them, the price being $559.11 for 645 copies.

The work of editing the manuscript for the report and arranging it for the printer was unexpectedly large. The great diversity in the style, orthography, capitalization and punctuation of the
various papers made necessary thousands of minor changes in the manuscript.

Further, correspondence with the authors of some of the papers was necessary to clear up certain ambiguous matters before the report could be placed in the hands of the printers, and notwithstanding a great deal of time put in on the report, it was not until the second of February that it was in the hands of the printer.

Unfortunately during the next six weeks, the writer was compelled to be out of the city most of the time attending veterinary meetings, and as a result the publication of the report was delayed at least thirty days longer than it otherwise would have been. However, all orders for the book were filled on April second, which is perhaps as early as the report has been issued in former years.

A comparison of the price paid the printer for this report and the price paid for former reports will show that the twentieth annual report cost a great deal more than its predecessors. This may be accounted for in part by the fact that it contains sixty odd more pages or is about one-third larger than the report of the year preceding and is nearly twice as extensive as some of the reports of a few years ago and by the further fact that the reports for the past two years have been bound in cloth. But the increase in cost is due most of all to the extraordinary increase in the cost of the manufacture of books, particularly in the cost of paper stock which is approximately 100 per cent higher than in normal times and in the cost of binding which is 50 per cent higher.

Under present conditions the cost of publishing an adequate report of the meetings of this association cannot possibly be paid for out of the receipts from the sale of the report if the price be kept at $1.00. Perhaps it is not advisable that a price that will pay for the cost of manufacture be set on the report. It might be advantageous to the association to distribute a considerable number of these reports free and the remainder at less than cost as at present. I may say that I am convinced that some free distribution of the report would further the aims of the association in no small degree.

Of one thing there can be no question—to accomplish the greatest good, the reports of our annual meetings should be issued more promptly than they were this time or in previous years. The first consideration in getting out a prompt report must be to get the report in the hands of the publication committee at an early date. From a considerable experience in the reporting of meetings of this character, the writer does not hesitate to say that a copy of all papers and a transcript of the stenographic
notes of the discussions at our meetings could be put in the hands of the publication committee within ten days after the close of the meeting just as easily and just as cheaply as it can be turned over to the committee in ten weeks, and we strongly recommend that in contracting for a report of the meeting provisions for this be made.

Further, the onerous work of the editing of the manuscript can be very materially lightened and accordingly hastened if the members reporting on the live stock conditions of the various states will make their reports more to the point. A number of those reporting from the various states sent to the secretary their annual reports, often comprising as much as two hundred pages of printed material, and expected the editor to go through all of this and pick out that which was essential. Obviously but little space can be given to the conditions in any one state, and the executive officer in charge of the live stock sanitary measures in that state is better able to judge what is essential to report and of public interest than any one else. We cannot urge too strongly that those reporting for the various states prepare a special report for this association, couching it, except perhaps in exceptional cases, in not more than 500 words, and that they do not, as has heretofore been done, send a mass of material, a record of their activity for the whole year, nine-tenths of which is of interest to no one outside of the state, and expect the editor of the report to select that which is proper to use in our annual report.

A further recommendation of the committee, and of the advisability of this there can be no question in the minds of the committee, is that the dues of the association be increased $1.00 and that a copy of the annual report be furnished free to each member. It is astonishing that any member of this association, who attends one of our meetings, should be content to leave it without leaving his order with the secretary for a printed report of the meeting, but such is the case. And it is still more astonishing that any member of the association, knowing the character of our meetings and who is not able to attend, should neglect to supply himself with its reports. Nevertheless a majority of our members neglect to purchase these reports.

The committee on publication also feels that one means of extending the usefulness of the association and bringing greater credit to itself and to the contributors on its program, is being overlooked in not giving greater attention to publicity at our meetings. It is our belief that the publisher of every agricultural, live stock and veterinary publication in the country should be specially invited to attend the meetings and every courtesy shown them and every facility provided to aid them in obtaining an adequate report of the meeting. The invitations also might
be extended to the editors of the live stock market reports and perhaps others on many of the metropolitan dailies. We believe if such action were taken that many of the papers presented at our meetings which are of public interest would be immediately published widely in the agricultural press of the country. This would enhance the prestige and power of the association and increase many fold its influence upon the live stock interests of the country.

PRESIDENT WILLS: Gentlemen, you have listened to the report of the Committee on Publication. Is there any discussion?

DR. COOLEY: Mr. President, I was very much impressed with Dr. Campbell's recommendation in regard to increasing the dues, so that each individual member may be furnished with a copy of the report. I am in favor of such a movement, and if they think that one dollar will be sufficient to cover it, I would move, if it is proper, that the dues be increased to two dollars.

PRESIDENT WILLS: The report of the committee, Dr. Cooley, should first be acted upon. Possibly it would facilitate matters if the chair might offer this suggestion, namely, that the matter be referred to the Executive Committee for consideration, and in that way it will be brought before the members as a resolution, or as a recommendation, if that meets the approval of the membership.

DR. RANCK: Mr. President, I think that Section 11 of the by-laws provides for that. I will offer, as a substitute motion, that this report be accepted, and referred to the Executive Committee.

The motion was seconded.

PRESIDENT WILLS: Is there any further discussion? I believe that the Executive Committee would welcome any recommendations or suggestions.

DR. ELIASON: Mr. President, it seems to me that an effort might be made to get this publication into the hands of the average veterinarian. Just as a suggestion, I want to urge upon every officer from the states represented here, that he will make an effort to sell as many of these extra copies that he now has in his own state, as he possibly can. I am sure I shall do my part and dispose of a number of them.

The motion was carried.

PRESIDENT WILLS: We will now pass to the reports of the special committees. First is the report of the Committee on Diseases. Is Dr. Reichel present? If that report is not here, that will have to be postponed, I suppose. Are there any other committees that are in a position to report at this time, to facilitate business? If not, the Chair will entertain a motion that we adjourn until the afternoon session.

The motion was seconded and carried.

An adjournment was taken until two o'clock. p.m.

SECOND SESSION
Monday, December 3.

PRESIDENT WILLS: The meeting will please come to order. Dr. Ward has an announcement to make before we proceed.

SECRETARY WARD: I want to announce that I have just received a telegram from Mr. Munn: He advises me that the Public Safety Committee of Minnesota some time ago issued a mandate requiring the distributors of milk to furnish milk to the cities at a certain price. The
distributors refused to obey the order, and the Public Safety Committee on Saturday issued a call notifying the distributers to appear today, so Mr. Munn was required to stay there during the investigation. He asked me to give the Association his regards and his regrets at being unable to fulfill his engagement.

PRESIDENT WILLS: In the absence of Mr. Munn, we will be obliged to proceed to the next paper on the program. We will therefore hear from Dr. J. A. Kiernan, on, "The Control and Eradication of Bovine Tuberculosis." Dr. Kiernan.

THE ERADICATION OF TUBERCULOSIS FROM CATTLE AND SWINE

By J. A. Kiernan, Washington, D. C.
Chief, Tuberculosis Eradication Division, U. S. Bureau of Animal Industry.

It is not the purpose of this paper to discuss tuberculosis from a scientific viewpoint, but to deal with it in a practical way, and endeavor to outline some proposed plans for its eradication. You all well know that the disease has been rapidly spreading and that it now exists in every state and possession of this nation.

There is substantial evidence to indicate that the percentage of tuberculous cattle and swine in certain states is very large. In others it is confined chiefly to the dairy herds within a short radius of cities, and to the beef herds which have been augmented by recent importations of cattle from other states. From these localities it will spread, unless controlled, until practically all of our cattle and swine herds are diseased. The data furnished by the meat inspection division of the Bureau of Animal Industry should cause concern to live stock producers, as it will to the public.

At the 883 official establishments in 253 cities and towns where Federal inspection is maintained, there were slaughtered during the year terminating June 30, 1917, 40,000,000 swine, and, of that number, 3,974,000 were on postmortem examination, found to be affected with tuberculosis. Practically ten per cent of the total killed, were affected with the disease. The percentage of tuberculosis found at the same establishments the year before was about nine and during the previous year it was less.

These figures are serious, challenging facts, that put the matter clearly up to the live stock producers. It is for them to decide whether the plague shall go on increasing, or whether it shall be placed under subjection.

During the year 1917, 203,193 cattle were on postmortem examination found to be affected with tuberculosis. While it is true that all the animals found diseased were not so extensively infected as to cause their entire condemnation for human consumption, should we be encouraged thereby? The fact that 10 per cent of the total animals slaughtered showed lesions of tuber-
culosis, should arouse the industry to the dire necessity of resorting to every available and possible means of checking the further ravages of the insidious enemy.

Unless prompt and remedial action is taken, each succeeding year will make the task so much harder. If the losses amount to tens of millions now, they will run up into hundreds of millions within a comparatively few years.

In our generation, the word "efficiency" has become almost a national by-word. Other industries, mechanical, scientific, and artistic are striving with might and main to make their work the most efficient possible. It behooves the live stock industry too, not only to be proficient in producing sires and dams of renown for size, conformation, beauty, disposition, production and fecundity, but for healthfulness as well; and it profiteth not to attain proficiency in all the other attributes if the animals produced are rotten at the core. Damaged goods can only be passed as first class articles by deception, and the day of reckoning has come, or will soon be here for the trafficker in tuberculous cattle. Ten years from now a cow that cannot stand up under a tuberculin test, without being saturated with tuberculin injected to withstand the test for interstate shipment, will not be worth twenty cents on the dollar.

The producer and feeder who is aware of the presence of tuberculosis among his cattle, is unjust to himself in cherishing the thought that it is unknown to others. His stock is marked on every market, and his neighbors' stock, too. They suffer financially, because their products are sold on the basis of a certain amount of waste.

Tuberculosis of cattle and tuberculosis of swine are usually found together, where both classes of stock are kept on the same farm. If the cattle are free from the disease, the hogs are usually healthy.

In localities where hogs are fed skim-milk from creameries, the largest percentage of tuberculosis is found.

As a rich nation, we can stand the annual losses caused by tuberculosis, but the future generations will be taxed dearly for our neglect if we go blindly on, unmindful of our obligations to preserve without blemish the inheritances we are now enjoying. If this generation were to leave behind it tumbled-down school-houses, wrecked bridges, impassable roads, corrupt society, and a bankrupt treasury, our age would be marked as one of inefficiency.

Our live stock industry is an institution no less than our banks, schools, churches and homes, and we who despoil it, are as wanton as the man who runs his farm, striving only for immediate gain, and unmindful of posterity.
Tuberculosis is an economic problem which may be solved by every live stock owner. We cannot hide behind the cloak of misfortune and claim immunity on the ground of our inability to prevent the infliction of fate.

Tuberculosis should be eradicated because it is a preventable disease. We tolerate it only because it is a habit some of us have acquired.

The question now is, What are we going to do about it?

Tuberculosis can be eradicated from all the cattle and all the swine in the United States. To support such a broad assertion there is an abundance of evidence, obtained through the school of experience covering a period of several years. Tuberculosis has been eradicated from hundreds of herds in the District of Columbia, Virginia, Maryland, and other states. It has been practically exterminated from comparatively large circumscribed areas.

Furthermore wherever and whenever an effort has been made to eradicate the plague and the earnest co-operation of the live stock owners and officials has been obtained, success has never failed to crown the enterprise. Herds of cattle, which, at the inception of the campaign, contained 75 per cent of diseased animals, have been freed of the malady and have remained free. Herds, which on the first test, were found free of disease, have, by the prudent care of their owners been kept free from tuberculosis.

The experience the Bureau has had, as outlined here, has been enjoyed by the officials of some states. The preponderance of successful experiments, if we may call them such, is convincing proof that when conditions are favorable, tuberculosis may be eradicated.

What Constitutes Favorable Conditions.

The same state of mind of the people that obtained in the early "nineties" when pleuropneumonia was eradicated; in 1902, 1908, 1914 and 1915 when foot-and-mouth disease was eradicated. The same spirit that pervaded the Western States during the cattle and sheep scabies' eradication campaign—the same spirit that has aided in the eradication of hog cholera. The same interest, that same earnest, hearty, wholesome and substantial co-operation that has made Texas fever eradication the success it is. The American people can eradicate tuberculosis, or prevent its eradication, or increase its presence. Whenever the people of a country decide to get rid of all the tuberculosis among cattle and swine, they can accomplish that work in a comparatively short time at a moderate cost, as is shown by the following
tables covering the work in the District of Columbia and the States of Maryland and Virginia.

**VIRGINIA, PERCENTAGE OF TUBERCULOUS CATTLE.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Original Herds</th>
<th>Annual Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>18.27%</td>
<td>4.45%</td>
</tr>
<tr>
<td>1911</td>
<td>13.72%</td>
<td>3.79%</td>
</tr>
<tr>
<td>1912</td>
<td>17.29%</td>
<td>3.03%</td>
</tr>
<tr>
<td>1914</td>
<td>10.14%</td>
<td>3.49%</td>
</tr>
<tr>
<td>1915</td>
<td>16.91%</td>
<td>3.48%</td>
</tr>
<tr>
<td>1916</td>
<td>7.08%</td>
<td>3.57%</td>
</tr>
<tr>
<td>1917</td>
<td>6.39%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

**MARYLAND, PERCENTAGE OF TUBERCULOUS CATTLE.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Original Herds</th>
<th>Annual Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>15.74%</td>
<td>2.68%</td>
</tr>
<tr>
<td>1911</td>
<td>20.02%</td>
<td>5.17%</td>
</tr>
<tr>
<td>1912</td>
<td>21.42%</td>
<td>3.64%</td>
</tr>
<tr>
<td>1914</td>
<td>11.21%</td>
<td>3.64%</td>
</tr>
<tr>
<td>1915</td>
<td>21.97%</td>
<td>3.15%</td>
</tr>
<tr>
<td>1916</td>
<td>9.9%</td>
<td>2.53%</td>
</tr>
<tr>
<td>1917</td>
<td>12.33%</td>
<td>2.58%</td>
</tr>
</tbody>
</table>

**DISTRICT OF COLUMBIA, PERCENTAGE OF TUBERCULOUS CATTLE.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>15.87%</td>
</tr>
<tr>
<td>1911</td>
<td>3.7%</td>
</tr>
<tr>
<td>1912</td>
<td>1.29%</td>
</tr>
<tr>
<td>1914</td>
<td>1.1%</td>
</tr>
<tr>
<td>1917</td>
<td>.34%</td>
</tr>
</tbody>
</table>

In 1917, the number of cattle tested by the Bureau was as follows:

**RESULTS OF CO-OPERATIVE TUBERCULIN TESTING OF CATTLE, FISCAL YEAR, 1917.**

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Passes</th>
<th>Reacted</th>
<th>Reactors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Schools</td>
<td>413</td>
<td>336</td>
<td>27</td>
<td>6.5%</td>
</tr>
<tr>
<td>Maryland:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Original tests</td>
<td>325</td>
<td>285</td>
<td>40</td>
<td>12.33%</td>
</tr>
<tr>
<td>Annual retests</td>
<td>1,387</td>
<td>1,351</td>
<td>36</td>
<td>2.58%</td>
</tr>
<tr>
<td>Total</td>
<td>1,712</td>
<td>1,636</td>
<td>76</td>
<td>4.43%</td>
</tr>
<tr>
<td>Virginia:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Original tests</td>
<td>3,712</td>
<td>3,477</td>
<td>235</td>
<td>6.33%</td>
</tr>
<tr>
<td>Annual retests</td>
<td>8,329</td>
<td>8,212</td>
<td>117</td>
<td>1.4%</td>
</tr>
<tr>
<td>Total</td>
<td>12,041</td>
<td>11,689</td>
<td>352</td>
<td>2.92%</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>1,060</td>
<td>1,051</td>
<td>I</td>
<td>.84%</td>
</tr>
<tr>
<td>Interstate entries</td>
<td>388</td>
<td>305</td>
<td>24</td>
<td>6.44%</td>
</tr>
<tr>
<td>Total</td>
<td>1,448</td>
<td>1,416</td>
<td>33</td>
<td>2.27%</td>
</tr>
<tr>
<td>Pure Bred Herds:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Original tests</td>
<td>2,462</td>
<td>2,351</td>
<td>101</td>
<td>4.11%</td>
</tr>
<tr>
<td>Annual retests</td>
<td>2,034</td>
<td>1,978</td>
<td>56</td>
<td>2.75%</td>
</tr>
<tr>
<td>Total</td>
<td>4,496</td>
<td>4,329</td>
<td>157</td>
<td>3.5%</td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>20,101</td>
<td>19,458</td>
<td>645</td>
<td>3.21%</td>
</tr>
</tbody>
</table>

**STATISTICS RELATIVE TO THE ERADICATION OF TUBERCULOSIS FROM THE DISTRICT OF COLUMBIA FOR THE FISCAL YEARS—1910-1917.**

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Number Cattle Tested</th>
<th>Percentage of Reacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>1,701</td>
<td>18.87</td>
</tr>
<tr>
<td>1911</td>
<td>1,967</td>
<td>3.17%</td>
</tr>
<tr>
<td>1912</td>
<td>1,390</td>
<td>Number percent 1.83</td>
</tr>
<tr>
<td>1913</td>
<td>1,534</td>
<td>Number percent 1.53</td>
</tr>
<tr>
<td>1914</td>
<td>1,623</td>
<td>Number of reactors 1.75</td>
</tr>
<tr>
<td>1915</td>
<td>1,078</td>
<td>Some of which 1.10</td>
</tr>
<tr>
<td>1916</td>
<td>1,184</td>
<td>Were not appraised 2.30</td>
</tr>
<tr>
<td>1917</td>
<td>1,050</td>
<td>.34</td>
</tr>
<tr>
<td></td>
<td>11,542</td>
<td>4.08%</td>
</tr>
</tbody>
</table>
TWENTY-FIRST ANNUAL REPORT

The campaign for eradicating tuberculosis has been planned with three separate projects as follows:

1. Eradication from pure-bred herds of cattle.
2. Eradication of tuberculosis from swine.
3. Eradication from circumscribed areas.

**Eradication of Tuberculosis From Pure-bred Herds of Cattle.**

Pure-bred herds which have been tuberculin tested and found to be free from tuberculosis, will be classed as accredited herds, that is herds which the state or federal authorities may certify as being free from the disease. This certification will be a tremendous stimulation to the trade among cattle known to be healthy. The prospective purchaser will be willing to part with his money, when he invests in cows which are not blighted by disease. The person who is upbuilding his herd, will find security when he purchases registered sires and dams to introduce into his bovine family. The known healthy animal will be in great demand; whereas the unknown quantity will be on the bargain counter. The accredited herds will have entree into any corn-community, while the unknown will be admitted for use only in localities where there is a premium on uncertified live stock.

The movement to establish accredited herds is purely a voluntary one. No laws will be necessary to assure the success of this plan. Its success will depend upon the judgment and decision of the live stock owners. It is a practical proposition for the practical live stock owner. It is a plan of fair dealing, without the speculative chance which attends the purchase of cattle from a
herd known to contain, or to have recently contained, animals affected with tuberculosis, or which are under suspicion.

Eradication of Tuberculosis From Swine.

Tuberculosis of swine exists to an alarming degree. Each year the carcasses of thousands of swine are condemned as unfit for human consumption, at abattoirs where federal inspection is maintained. The remedy for this evil is the pasteurization of dairy by-products, which are fed to swine and of course the elimination of the existing cause, the tuberculous animals which are the distributors of the tubercle bacilli. Tuberculous cattle are the principal source of tuberculosis in hogs, the disease being transmitted readily by feeding the hogs on unpasteurized dairy products, and by allowing hogs to follow such cattle in the feed lot, and to feed upon the undigested grain in the droppings.

That hogs, which are fed on garbage may become tuberculous and in many cases unfit for food, or may be maintained free from tuberculosis, is well set forth in the following observations, which have come to the notice of the Bureau.

Charles Miller & Company, Establishment 517, in the year ending 1911 slaughtered 2,199 hogs which had been fed on garbage from New York hotels. This garbage had been sterilized at the establishment and all hogs thus fed were free from tuberculosis. No other feed was used excepting a short finish on stale bread.

During the same period, 34,295 hogs, purchased from outside sources, were slaughtered at the same establishment. Of these 253 were affected with tuberculosis.

Bureau inspectors report 30 per cent of the hogs in a lot which had been fed upon city garbage in Philadelphia were affected with tuberculosis. Cultures obtained from two spleens showed tuberculosis of the human type.

In an investigation of hogs fed on garbage from the kitchen of the tuberculosis section of an insane asylum, lesions of six tuberculosis hogs were submitted to the laboratories. Two showed human type tubercle bacilli while four showed bovine type.

In Bureau letter of October 27, 1911, to Mr. M. N. Baker, editor of "Engineering News," New York City, it was stated that reports received by the Bureau concerning the feeding of unsterilized garbage showed that from 20 to 40 per cent of the hogs were affected with tuberculosis. Some cases appeared to be of the human type.

The Chief of the Bureau in a letter to Dr. Henry Busman, Denver, Colo., dated November 24, 1911 said, "The position
which I am assuming regarding the feeding of garbage to hogs is, that selected and sterilized garbage is of considerable economic value in the feeding of hogs and if proper piggeries are provided, that it should be permitted under the above conditions."

Dr. Rishel, Los Angeles, Calif., submitted several reports to the Bureau of postmortem examinations made at that station, as follows:

December, 1910, 80 garbage-fed hogs slaughtered; 16 tuberculous; percentage infected, 20.
November, 1910, 287 garbage-fed hogs slaughtered; 69 tuberculous; percentage infected, 27.
September and October, 1910, 252 garbage-fed hogs slaughtered; 86 tuberculous; percentage infected, 33.
November 26, 1909, to July 18, 1910, 39,928 other than garbage-fed; 1,044 tuberculous. Per cent infected, 2.61.
1,960 unsterilized garbage-fed, 210 tuberculous. Per cent infected, 10.71.

Another report from Los Angeles, Calif., shows 290 garbage-fed hogs slaughtered; 98 tuberculous. Per cent infected, 33.79.

The Eradication of Tuberculosis From Circumscribed Areas.

The eradication of tuberculosis from circumscribed areas, should be taken up first in states where the disease exists to a comparatively slight extent. It should be taken up in a county very much after the plan which the Bureau has practiced successfully since 1906 in eradicating cattle tick. The people should be fully advised of the object sought, before an attempt is made to eradicate the disease; and it is my judgment that the matter should be submitted to a referendum before starting the campaign. If the majority of the people vote in favor of eradicating tuberculosis, the county should pay its part of the burden of expense. Veterinarians should be employed by the county to co-operate with Federal and state inspectors in testing the cattle and disposing of the reactors; in supervising and disinfecting of barns and other buildings where tuberculous animals are housed; and in supervising the restocking of herds which have been reduced in numbers by the slaughter of diseased animals.

All cattle in the county in which the campaign is being conducted, which are six months of age or over, shall be tuberculin tested with tuberculin prepared by the Bureau of Animal Industry. Such cattle as react to the tuberculin test, shall be appraised and destroyed under supervision.
Proposed Indemnity for Animals Destroyed.

It is suggested that owners of condemned animals shall be reimbursed seventy-five per cent of the appraised value which, for grade animals should be $110 maximum, and for pure-bred cattle should be $200 maximum. The county in which the condemned cattle belong, should pay twenty-five per cent of the loss; and the state, and the Federal Department should each pay one-half of the remaining fifty per cent of the appraised value of the animal. This will leave twenty-five per cent of the loss to be sustained by the cattle owner.

Annual retests will have to be carried on in such areas for several years, and strict quarantine measures will have to be enforced to prevent the introduction of additional disease into the areas.

It is believed that with such a campaign, an entire state of 50,000 square miles may be cleaned in ten years, at an approximate cost to the Federal Government of $2,000,000.00.

There are absolutely no grounds upon which a reasonable estimate can be made of the number of years it will take to eradicate this disease. All one can do is to make a guess as to the time; and, it is my belief that if this nation succeeds in eradicating tuberculosis in fifty years, it will be one of the greatest heritages our successors will have handed down to them.

The mistake should not be made—and I am sure it will not be—of attempting to launch a great big campaign at this time in an effort to quickly eradicate tuberculosis among cattle. The campaign will have to be built upon a sound foundation. It will have to be started in a small area in a state and expand from that point. Great care will have to be exercised to prevent the matter from being exploited by enthusiasts, who desire immediate results which we know cannot be obtained.

The campaign which has been in progress in the District of Columbia for ten years is a lesson to the Bureau that the progress must, necessarily, be slow; and that the work can be accomplished only by the most thorough and well-directed effort.

One of the most important features of the work to be kept under consideration is the fact that we are dealing with an invisible disease, and the most effectual educational campaign that can be carried on in the eradication of tuberculosis, foot-and-mouth disease, or Texas fever is actually accomplishing results. The extermination of any disease from a county will convince more people of the practicability of the campaign than a thousand lectures.

Mississippi, the first entire state to complete the eradication of the tick, didn't talk them to death, but dipped the cows in her
5,000 concrete dipping vats. The educational campaign in Mississippi did not consist of words, but deeds, not lectures, but dipping vats.

**The Tuberculin Test.**

The subcutaneous tuberculin test, when applied by an expert, under favorable conditions, has been found by thorough autopsies and microscopic examinations to be extremely accurate. Statistics generally given are not reliable, for the reason that tuberculin is charged with its own mistakes, the mistakes of veterinarians applying the test, and the mistakes of the veterinarian conducting the postmortem examinations upon reacting animals. The test, as ordinarily applied, shows quite a number of inaccuracies. This is due in part to the carelessness of those applying the test; but in the greater number of cases is due to an insufficient dosage of tuberculin. In general testing, the failure is not so much in classing non-tuberculous cattle as reacting, as in classing tuberculous animals as non-reactors. These animals in certain instances do react under the application of a small dose of tuberculin. A partly arrested lesion of tuberculosis may respond at any time, in from the sixteenth to seventy-second hours, following its injection. The efficacy as well as the reliability of the tuberculin test is in some measure dependent upon the herd owners and managers. These persons must not only be intelligent but honest as well. Experiments are now being conducted by the Bureau at a number of stations with various forms of tuberculin prepared by the biochemic division.

**Proposed Regulations for Accrediting Pure-Bred Herds of Cattle.**

An accredited tuberculin tested pure-bred herd is one which has been tuberculin tested by the subcutaneous method, 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 being conducted. Further, it shall be in a herd in which no animal affected with tuberculosis has been found either by the tuberculin test, as above described, or by physical examination. It shall be composed of not less than fifty per cent pure-bred and registered females and only pure-bred and registered males.

The entire herd, or any cattle in the herd shall be tuberculin tested or retested at such time as is considered necessary by the Bureau.

No cattle shall be presented for the tuberculin test which have been injected with tuberculin within three months immediately preceding, or which have at any time reacted to a tuberculin test.
No herd shall be classed as an accredited herd, in which tuberculosis has been found, either through the application of the tuberculin test, or by physical examination, until such herd has been successfully subjected to two consecutive tests with tuberculin, applied at intervals of not less than six months, the first interval dating from the time of removal of the tuberculous animal from the herd.

Prior to each tuberculin test, certificates of registration for each pure-bred and registered animal shall be submitted to the inspector, such certificates to be accepted as identification of the animal offered. Any grade females maintained in the herd, or associated with animals of the herd, must be identified by a tag, or other marking, satisfactory to the Bureau of Animal Industry.

All removals of cattle from the herd either by sale, death or slaughter, shall be reported promptly to the said Bureau of Animal Industry, giving the identification of the animal, and, if sold, the name and address of the person to whom transferred. If the transfer is made from one accredited herd to another accredited herd, the shipment shall be made only in properly cleaned and disinfected cars, and through stockyards, chutes, runways, etc., which have likewise been properly cleaned and disinfected. No cattle shall be allowed to associate with the herd, which have not passed a tuberculin test approved by the Bureau of Animal Industry.

All new cattle shall be separated from the herd, pending the approval of the tuberculin test or the application of a test by an approved inspector, notifying the Bureau immediately.

All milk and other dairy products fed to calves, shall be that produced by an accredited herd, or if from outside or unknown sources, it shall be pasteurized by heating to not less than 150°F for not less than twenty minutes, or to a minimum of 185°F for a shorter period of time.

All reasonable sanitary measures and other recommendations by the Bureau of Animal Industry for the control of tuberculosis, shall be complied with.

Cattle from an accredited herd may be shipped interstate, by permit obtained from the office of the state live stock sanitary officials of the state in which the herd is located, or from the office of the Bureau of Animal Industry without further tuberculin test, for a period of one year, subject to the rules and regulations of the state of destination.

Strict compliance with the above rules and regulations shall entitle the owners of tuberculosis free herds, to a certificate (Tuberculosis Pure-Bred Accredited Herd) issued by the Bureau of Animal Industry; said certificate good for one year from date of test, unless revoked at an earlier date.
Violations of the letter or spirit of these regulations shall be considered sufficient cause for immediate cancellation of co-operation by the Bureau of Animal Industry.

There are other phases of the subject which should be discussed; but, in conclusion, I will say that what is needed to accomplish results is the co-operation of the people. We must obtain their confidence by well-directed efforts and efficient, consistent service.

President Wills: Our next address will be on “Bovine Tuberculosis” by Mr. Russell, editor of the “Twentieth Century Farmer.”

BOVINE TUBERCULOSIS.

By E. Z. Russell, Omaha, Nebraska.
Editor, “Twentieth Century Farmer.”

The question of bovine tuberculosis is one that a few years ago did not bother the official because little attention was paid to it and cattle were allowed to be shipped with little question as to their health. We thought little about the spread of the disease and the man who did say anything about it and suggested that measures be adopted to control it was considered a crank.

Today, however, the situation is changed and we find ourselves facing a real problem, one that affects not only the live stock owner, but all citizens. The big trouble is the lack of knowledge. Live stock sanitary officials are today called upon to meet a condition and solve a problem that is vexatious to say the least.

If we were asked to sum up the whole problem and put it into a single word, this word would be education. The education necessary to successful control of bovine tuberculosis should probably be divided 50-50 between the live stock owners and veterinarians and live stock sanitary officials who have control of the regulations for live stock shipments.

Our great hindrance to the successful control of this disease is that it is generally invisible to the naked eye. An animal that is apparently in the finest of condition may be so badly affected that the carcass would be tanked if it were slaughtered in a government inspected plant. This fact is difficult to understand by the layman, yet if success is attained in the work of eradication the cattle owner must be made to understand that it is possible for conditions of this kind to exist. How are we going to get him to know these things and believe the disease can be detected by test?

Cattle owners might be divided into three classes: (1) Those who are sure there is no such thing as bovine tuberculosis. (2) Those who think there is such a disease but believe it cannot
be detected by test. (3) Those who feel that the test is fairly accurate.

If we could get accurate information to the first class, showing them that cattle and hog carcasses actually go into the tank because of the disease and that they are actual losers because of its existence, regardless of whether or not any of their animals are afflicted, it might start them to thinking.

Members of the second class are different and these must be converted by the practitioner in the field. Just a word to the practitioner. Don't be too cock sure you are absolutely going to make a perfect test. Don't tell the cattle owner that after you have tested his herd every diseased animal will be known and if he slaughters all the reactors shown by your test he can rest assured he has a clean herd. You may be mistaken, some of our best informed men have been mistaken. Always remember that the man never lived who didn't make a mistake. Would it not be better to say to the owner that the test is 98 per cent true and that he can be reasonably sure that those showing a reaction are free from the disease, also that you are practically sure that all of the animals showing a reaction will show lesions on post-mortem examination. Advise him further if he wants to be absolutely safe that he should have all his cattle retested in about six months, so that any animals now in the first stages of disease may be detected and weeded out.

If we are to convince the man who doubts the reliability of the test we must show accuracy in testing. This can be done only by confining the work of testing to men who know how. Because a man is a graduate, licensed veterinarian, it does not necessarily follow that he is qualified to make an accurate test. If we were handling this matter in our own way no one would be allowed to make a test until he had passed a satisfactory examination made by a qualified board. If this plan were followed there would be many more reliable tests made and in turn unbelievers would in a short time feel that this method of detecting the disease was reliable.

Every man who owns animals that react and are sent to slaughter should be urged to accompany these animals to market and watch the postmortem examination after slaughter. He will then be convinced.

We have talked to stock owners who have had cattle condemned by government inspectors, and all the owners knew about this was a statement from the commission man telling him the animals were condemned. If a report of postmortem of some kind coming from the B. A. I. official making the test could be sent to each owner who sold his animals "subject," it would be
of assistance in convincing the owner that the animal was really affected with the disease.

Sometimes practitioners make tests on cattle that have recently been given an injection of tuberculin and not knowing of this injection are not able to get reactions they should get, with the result that they are blamed for not making a correct test. We would provide for state license of all distributors of tuberculin, providing that no tuberculin could be sold or given away except to those holding license, in the state, to test. This with a system of reports of distribution and use of the product we believe would materially reduce the danger of practitioners being charged with these mistakes.

Our investigations have shown us that quite a number of practitioners frequently advise holding certain animals for retest. This is probably good advice in some instances, but does not the practice have a tendency to make the cattle owner think the practitioner is not sure about his test and consequently does not know his business as he should. We would, as far as is safe, discontinue recommending the holding of cattle for retests but would at once classify them as clean or as reactors.

State veterinarians and sanitary officials could do wonders in the way of satisfying the stock men and getting their cooperation if they would be more diplomatic. An official order can be so worded that it will at once make the man affected want to fight or it can be just as official and produce the desired result by clothing it in language that will make the stock owner feel that the official is his true friend and really trying to assist him instead of bearing down on him. Never use the official club unless you are compelled to do so. Always remember that men can be far easier led than driven. Sanitary officials should always try to be of assistance to stock men and never try to show that they are masters.

If effective work in tuberculosis control is done we must have the closest of cooperation between the stock men, the practitioners and the officials. In our opinion the one thing that has been the greatest barrier to the necessary cooperation has been that the shipping regulations effective in different states have been and are now anything but uniform. A shipper may comply with the regulations to get his animals into a certain state and then when he wants to ship them on he finds entirely different regulations and he is obliged to go to the expense of securing a new certificate. These things are exceedingly irritating to stock men and do not tend to get them into the humor to help in control work.

The ordinary live stock man, and we are one of them, can see no good reason why a certificate that will take an animal
from, say Iowa into Nebraska or Missouri, will not be sufficient to take the same animal on into Kansas, Illinois, Indiana or any of the other adjoining states. When shippers bump up against these different rules for different states is it any wonder they talk about veterinarian graft?

In bovine tuberculosis work we are now about to the place where the accredited herd plan will have to be taken into consideration. Personally we feel that the accredited herd proposition is a good one and a real benefit to the cattle owner. In working out the accredited system and putting it into effect state veterinarians and sanitary officials have it within their power to take a long step forward toward securing the co-operation we should have between stock owners and officials. On the other hand, if they don't hang together they can "spill the beans" and make it harder than ever for these two interests to pull together.

All state sanitary officials have it within their power to make such requirements for accredited herds as in their judgment seems best. Looking at this matter through our own eyes we can see no good reason why the requirements for accredited herds in all the states should not be uniform. We would like to have some one show a good reason why they should not be so. If no good reason can be given, why then should not all of these officials get together with officials from the B. A. I. and work out a requirement for accredited herds that every state can adopt.

The accredited herd takes care of the pure-bred animal, but what about the grade, what about the pure bred that in order to get by a test is shipped into another state as a grade and sold as a feeder or grazer? Efforts are being made to build up the pure-bred cattle business. Is it an incentive to the pure-bred breeder to be required to have his cattle tested before getting them into the state, when his neighbor across the fence can ship all the grade cows he wants, diseased or clean? To just what extent is a man's herd protected by having none but tested pure-bred herds come on to his premises when the cattle in the next pasture come in without any test or other requirement, barring sometimes a hurried physical examination?

We fully realize the necessity of not going too fast in requirements, we always realize that effective work can't possibly be done if the regulations are too lax. We believe that every state should require that every pure-bred animal coming into the state must come with a test chart made by a reputable veterinarian, showing no reaction. We would provide that no grade female cattle or bulls should come into the state or through any public stockyards to any farmer's premises except that they be auto-
nationally in quarantine to be released only for immediate slaugh-
ter, by permission of the state veterinarian or after having
successfully passed the tuberculin test.

We would further require that all pure-bred cattle offered
for sale at public auction in any state must first have been tested
and successfully passed the test. When the time came and we
thought it could be done we would not allow any pure-bred
animal to be sold at either public or private sale until they were
shown to be free from tuberculosis, then later we would extend
this requirement to grade females and bulls.

The question now comes up as to what should be done with
the reactors found in these tests. Generally we believe that they
should be sent to slaughter, not, however, without the owner
being paid for all animals ordered slaughtered. The animals
should be appraised at their cash value and payment made de-
pendent on the condition of the carcass at the time postmortem
is made.

It hardly seems fair to us that these animals should be paid
for by general taxation in any state. We believe the people of
the whole country are benefited to the extent that the United
States Government should come in for a part of the indemnity.
Our belief is that the amount paid to cattle owners as remunera-
tion should be divided 50-50 between the state and the United
States Government.

There are certain cases where reactors are found among valu-
able breeding animals, wherein it would be best to have the
animals placed in quarantine and allow them to be used for
breeding purposes. We have pure-bred breeders who would
handle reacting animals as they should be handled, then again
we have others who would not keep them in close enough quar-
antine to guarantee the safety of the other animals on the farm.
We believe it possible and practical for a system of inspection
to be made of these quarantined animals, and when it is found
that the owner is not complying with the quarantine regulations
the animal should be slaughtered.

Desired results can be obtained only by having men of in-
tegrity handle the business. This applies to veterinarians and
to live stock owners alike. We like the plan adopted by some
states of maintaining a black list, of cattle men whom officials
feel absolutely sure have been doing crooked work. Admission
to the state should be refused to any animals coming from herds
owned by these men, regardless of any condition. On this list
will also be the names of veterinarians making test sheets that
have been proven to be crooked and officials should refuse to
accept any animals on a test chart made by these men.

We have talked to a good many cattle men about crooked
veterinarians who make crooked test charts. There are too many of this class of men in the country, but do we ever stop to think that before we have a crooked veterinarian making these crooked charts, we must have a crooked cattle man who makes it profitable to the veterinarian to be crooked. The keeping of these black lists would help materially to weed out both of these classes.

In our opinion one of the greatest and most effective steps in advance can be made by city and village boards passing ordinances requiring that all cows used in furnishing milk for consumption in such city or village must first be tested for tuberculosis by a qualified man and found to be free from the disease. Ordinances of this kind are now in effect in quite a number of cities and villages and are having their effect. The courts, clear up to the Supreme Court have held ordinances of this kind valid. The enforcement of ordinances of this kind influences many to have their cattle tested and almost always it is found that there are cattle in the community affected with tuberculosis. As a result other men in the country who are not compelled to test, wonder whether or not they are harboring the dangerous disease in their herd.

Some men who have given the matter of control and eradication considerable thought and study have about come to the conclusion that it is almost impossible to eradicate the disease. Taking a broad view of the matter it will be readily seen that much has been accomplished, and it seems to us that we shall see a very material advance in the work in the next five years. Many states are getting much better organized for effective work than they were two or three years ago.

If state authorities will quit quibbling over little matters that really amount to almost nothing and get down to brass tacks and try to do effective work a whole lot can be accomplished. We call attention to what was done by the B. A. I. in the District of Columbia. In this work the officials felt that they could wipe out the disease. They worked out a plan, put it in operation, and kept at it until the disease was practically eliminated. True it was they were not hampered with politics or changing administrations.

What has been done by B. A. I. officials in the District of Columbia can be done in any county, district or state if officials, cattle owners and practitioners will get together and make up their minds to wipe out the disease. When we stop to consider the enormous losses because of condemned carcasses, the loss because of slight gains by diseased cattle and hogs and the terrible inconveniences to cattle men in making shipments, is the effort not worth while? Then over and above all this is the
sacrifice of human lives, a loss that cannot be calculated in dollars and cents. When this loss can be prevented, knowing all these things, is there any excuse for us not exerting every effort possible to eliminate the cause?

**PRESIDENT WILLS:** Our next paper is “Plan for Branding Cattle in Connection with Accredited Herds,” by Dr. Fritz.

**PLAN FOR BRANDING ACCREDITED HERDS.**

*By W. J. Fritz, Bureau of Animal Industry.*

The annual government and state records in connection with extensive tuberculosis eradication in pure-bred cattle will run into millions eventually. It is, therefore, necessary that a universal system of permanent marking of animals free from tuberculosis be adopted, in order that an animal accredited in Maine may be easily identified and recorded in California, should the occasion arise.

There are at least four methods by which cattle are now identified, viz.: the tag, tattoo, certain markings on the animal, and the hot iron brand system.

The tag system as a whole may be concretely summed up in the following manner: From the time the animal is tagged until it dies, the loss of tags, duplication, or assigning of new numbers will nullify the best record system that can be devised.

The tattoo system is not adaptable for universal marking, as there are certain breeds of animals which have dark skin surfaces. This is also true of the system of identifying animals by peculiar markings on the individual, due to the fact that there are a large percentage of breeds that present solid colors.

The hot iron system is not new. Heretofore, it has been used in this country as a successful method of identification. In foreign countries it serves the same purpose, and in addition certain foreign countries use the brand as a mark of distinction on sires for the purpose of producing improved types. The adoption of such a system in connection with tuberculosis eradication would not only serve as a means of identification, but would be a mark of distinction. In launching such a system, the first step in accrediting a herd for interstate movement would be to identify the animal by a permanent state number, test number, and the addition of a certain number of negative test marks. According to a cross file by states, Alabama would be “1” and Wyoming “49,” which should be the primary mark in connection with a suitable adopted marking for venting the state number should occasion arise, as shown by exhibit “A”:

A <1> <22> <49>
The characters 5, 10 and 15 identify the animal for all tuberculin tests, as shown by exhibit "B":

```
<table>
<thead>
<tr>
<th>5</th>
<th>10</th>
<th>15</th>
</tr>
</thead>
</table>
|<1>|<22|<49>
```

The unit marks "II" and "III" represent the two annual or three semiannual negative tests necessary for accrediting a herd in Minnesota, as shown by exhibit "C":

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<table>
<thead>
<tr>
<th>20</th>
<th>60</th>
</tr>
</thead>
</table>
|<22|<22>
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II

III

Assuming that a Minnesota herd consisting of 100 head are branded according to this system and that all have passed a negative test, the veterinarian, upon completing the test, with the aid of a small ether generating-iron records the negative test mark on the animal, as shown by exhibit "D":

```
1 to 100 inc.
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<table>
<thead>
<tr>
<th>D</th>
</tr>
</thead>
</table>
|<22>
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In the event that numbers "5" and "10" were classed as suspicious, the negative test mark should be withheld, as shown by exhibit "E":

```
5
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```
10
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<table>
<thead>
<tr>
<th>E</th>
</tr>
</thead>
</table>
|<22|<22>
```

All typical reactors on the initial or subsequent tests should be vented by the veterinarian upon completion of the test, as shown by exhibit "F":

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70
```

```
6
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<table>
<thead>
<tr>
<th>F</th>
</tr>
</thead>
</table>
|<22|<22|<22|<22>
```

```
<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
</table>
```

The system of marking as outlined is flexible, for example:

In the John Doe Minnesota herd, Test No. 60, Minnesota Pride, Registry No. 1000, has reacted to the tuberculin test and slaughtered. The unit "60" is, therefore, again available in this herd for the initial test of Pride of Minnesota, Registry No. 1500. In the event John Doe sold Conedale the Fifth, Registry No. 5000, Test No. 50, to John Smith in South Dakota, the unit "50" would not be available in the Doe herd again until this animal is reported condemned, slaughtered or dead. In this instance John Smith may have two animals with Test No. 50, as shown by exhibit "G":

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70
```

```
6
```

```
<table>
<thead>
<tr>
<th>F</th>
</tr>
</thead>
</table>
|<22|<22|<22|<22>
```

```
<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
</table>
```
Conedale the Fifth, Registry No. 5000, Test No. 50

Ben Huron, Registry No. 2500, Test No. 50

The transfer on the Minnesota animal could be made upon receipt of uniform cards from the owner along the following lines:

John Doe St. Paul, Minnesota, transfers the following described animal to John Smith, Huron, S. D.

“Breed Shorthorn,” Conedale the Fifth, Registry No. 5000

Accredited brand mark: Test State Negative Test
No. No. Units
50 <22> III

Suitable cards could be made for owners, officials, etc., for reporting the condemning, slaughtering or death of animals.

It will be noted that from the time the initial test is started until the animal is disposed of by condemning (with the vent mark), transfer, slaughter or death, only four numbers are involved, as shown by exhibit “H”:

Conedale the Fifth, Registry No. 5000, Brand Nos. 50 Test unit

By using basic characters which are permanent on the animal as above illustrated, the veterinarian making the test will be relieved of unnecessary delay and the uncertainty of obtaining the name and registry number at each semi-annual or annual test. In many instances, the owners or their representatives are in doubt as to the identity of certain animals; which makes the present test record sheets of doubtful value under existing conditions, for it is impossible to distinguish good grades from pure breeds in certain breeds of animals, notably the Angus, Red Poll, Short-horns and Herefords.

The adoption of such a system on the part of the various states or breeders would make it possible to devise uniform triplicate test sheets by which the same animal could be identified without delay by the same test number at the beginning of each subsequent test until the animal is removed from the herd. From the original test sheets, the proper officials would be in a position to issue or cancel accredited herd lists, record transfers, etc.

In launching a branding system there will be some opposition to branding as a means of identification on pure bred cattle, due to
a large percentage of owners having observed the large brands placed on range cattle. The range brands are made large for easy identification at longer distances than will be required for this system. It is entirely practical and possible to devise branding units for applying the test and state numbers on the animal which will be small in size and legible. A good site for successful branding and rapid recording during tuberculin tests would be high on the rump, and a space approximately 7 x 7 square inches would be required for placing the entire brand.

The proposed marking and record system should appeal to the various officials of pure-bred associations, for it would place them in a position to offer a complete accredited herd record to every breeder throughout the country at a very nominal fee per annum. By consulting such established records, breeders would be in a position to more readily negotiate the purchase of new healthy strains of blood throughout the country than heretofore. The connecting of the registry number to the test, state and negative test numbers will be a mark of distinction and a financial asset to the progressive state or breeder, due to the fact that the animal carries a complete record which is permanent and readily identified under any condition or circumstance. Reduced to business terms, the animal carries its own trademark of health from a tuberculosis standpoint, which will have more weight in the end than a test sheet obtained under past or present conditions. An additional financial asset to the progressive state and breeder would be the unrestricted interstate movement of cattle marked in this manner.

The production of high grade pure-bred healthy cattle is a highly specialized industry, and if judged by the standards of other lines of business, the breeders' product should carry an official trademark, prominently displayed, that the animal is free of tuberculosis insofar as our present knowledge will permit.

PRESIDENT WILLS: We will now proceed to the discussion, and call upon Mr. Smith, live stock commissioner of Chicago, to open the discussion on tuberculosis.

MR. H. R. SMITH: Mr. Chairman, and gentlemen: I do not know that I can add anything new to what has been said by the previous speakers. I can only say a few things that have come out of my own experience with this disease. I want to say, first of all, that the program committee is to be highly congratulated for devoting a half day to the discussion on this subject. It is probably the most important subject that we have—the matter of disease control. I think that you will all agree that in the northern half of the United States tuberculosis is the greatest menace to the live stock industry that we have. Some of you might say that contagious abortion is equally destructive, but it being confined to cattle, and tuberculosis affecting both cattle and swine, I think it is safe to say that this disease is the greater menace. I had occasion a few days ago to take the figures from the Meat Inspection
Department Division of the Bureau and I figured out what the losses were at the seven west markets. It shows that during the year 1916, 50 trainloads of cattle and hogs of 40 cars each consigned to seven middle west markets were sent to the tank, all due to tuberculosis. The seven markets I refer to are Chicago, Kansas City, Omaha, St. Joseph, East St. Louis, Sioux City and St. Paul. Just how this disease got such a hold it is difficult to say. It has certainly been getting a very tenacious hold on the cattle industry, as well as the hog industry of this country. Personally I think that we can lay the blame for a good deal of this to our friends across the water. We take our hats off to England and Scotland and other European countries for what they have done in the way of improving live stock, cattle, sheep and other classes of animals. We owe a great deal to them for what they have done for us and we are still drawing on those countries for our supplies of breeding stock. But my personal opinion is that we have got a bad dose of tuberculosis from those countries. I well remember some 22 years ago, at the Michigan Agricultural College, when we slaughtered a number of short horn cattle some of which were recently imported, it was brought home to me that there was some danger of getting diseased cattle from across the water. Then when Mr. Hill's herd, imported about two years ago, all with a clean bill of health, were tested, and a number of those valuable cattle were found to have tuberculosis, it looked very serious.

I want to say, first of all, that I believe we should be more careful in the way we handle these imported cattle. We have plenty of tuberculosis now, and we do not want to get any more. Personally, I think that all these imported cattle that come from across the water ought to be kept in strict quarantine on the importer's farm, until we know that they are clean. I believe we could avoid a great deal of trouble in that way. I have occasion to get special postmortem reports from the packing plants here in Chicago on shipments that come to the Chicago market, and I classify those reports by states. I keep track of these shipments from practically all the states that are tributary to the Chicago market, and without wanting to offend any of our Canadian brothers here, I want to say that Canada shows up in these special postmortem reports. I have not a very extensive report of Canadian cattle, but I have enough to show that Canadian cattle are not in very good shape, so far as tuberculosis is concerned. We have a number of states here in the middle west territory that make a very bad showing. I have reports from something like 8,000 hogs from one state in the middle west, 23 per cent of which were affected with tuberculosis. Of course, most of them were passed. Only a comparatively small percentage were condemned, but it shows a very bad condition. The percentage among cattle, of course, is much lower. In that state, on shipments of over 200 cars, or about 8,000 hogs—93 per cent of these consignments (one or more cars shipped by one man) showed one or more hogs affected with tuberculosis. Another state in the middle west territory shows 90 per cent. Now, I do not think that that one state was very much worse, although we do find a big difference in the states.

And I want to say this, too, that contrary to the opinion of a great many people—and it was my opinion, too, before I got into this work—there is tuberculosis in the range country. I was quite surprised at the relatively large number of cases of tuberculosis reported as being found in Montana and Wyoming. While the climate there is not conducive to this disease, it stands to reason that inasmuch as
those people are buying valuable breeding cattle all the time, it is an
easy matter to get the disease started even on the range. Although
trouble is not confined to any particular territory, the southern people
do not have nearly as much trouble with it as we do in the north. I
want to say that I thoroughly agree with Dr. Kiernan that it is going
to take years and years to get rid of this. It is so thoroughly dis-
tributed over the country, and it is found on so many farms, and it is
so little known, that it is going to be a tedious job to get rid of it.

I believe that this new movement of accrediting herds is going to
be the best that has ever been inaugurated to reduce tuberculosis in
this country. We cannot say definitely that pure-bred cattle have a
higher percentage of tuberculosis than grades, although I believe it is
true, and I think our figures will prove it. I know that it is true in
Minnesota, according to Dr. Ward's records, and I think it is true in
other states. It is particularly true of the beef breeds. If we can
eliminate the disease from the pure-bred herds, it is certainly going to
be a big step in getting the country cleaned up. It is going to stop
the spreading of the infection. With grades, the general movement
is from the farm to the slaughter house. As regards the shipping
grades out of Wisconsin to the west, there is more or less of that
being done; but nowhere near the big movement from farm to farm
among grades that there is among pure breeds. One bull might dur-
ing his life change hands three or four times, and if he has tubercu-
losis, he will spread the infection on all those different farms.

I like the plan that the Bureau has put into operation of cleaning
up by areas. I am glad to know that Wisconsin is starting out to
follow that plan in two counties this year. I think other states will
probably follow the same plan.

Now, in regard to the cleaning up of the pure-bred herds, from the
standpoint of one who has been identified with the breeding of cat-
tle all of his life, and who tries to keep posted on the breeding indus-
try of the country, I want to say that I believe we cannot be too strict
in handling tuberculosis on pure-bred farms. We must not order every-
thing slaughtered. It is not consistent with our ideas of conservation
at this time. If we were to slaughter all of the pure-bred cattle that
react to a tuberculosis test, it would put us in a very bad way, so far
as the breeding interests are concerned.

When we realize that last Saturday, for example, there was a sale
of pure-bred shorthorn cattle on one farm, the Harding farm in Wis-
consin, where the average of the sale was $1,550, and where one bull-
calf sold for $17,000, we see the seriousness of the situation. We have
had seven sales here this year in the shorthorn breed alone, where the
average price has been more than $1,000. We have had Hereford sales
where the average has been even greater. This shows a tremendous
demand for seed stock. It shows that the people of this country are
wanting to build up their herds, and they must be wanting material, to
pay those prices. That is the real criterion of the condition of the
country with respect to the demand for pure-bred cattle. And so I say
this: In all your dealings with these pure-bred herds, you have to use
care; you have to see that every effort is made to stamp out the dis-
ease, but do not require animals to be slaughtered unnecessarily. The
country cannot afford to do it. In handling this business, we must
handle tuberculosis with the idea, not of helping any particular breeder
or set of breeders, or any particular veterinarian or set of veterinarians.
It is a question of what is best for the live stock industry of the
United States. That is the thing we must consider in fighting this
disease. I have had considerable experience in handling herds and having them tested. I have no figures on it, but I think it is safe to say that at least 50 per cent of the cattle that react, and have the disease, are reactors—and probably more than that. It does seem a shame to require all of those reactors to be slaughtered, especially where they have valuable breeds. I have had occasion to correspond with a number of breeders who have kept herds in segregation, and I find that they have had very good success in handling segregated herds.

Among the dairy breeds segregation has not been so successful. I assume that the reason for this is that where a cow is giving a heavy flow of milk, she is under more of a strain, and cannot cope with the disease so readily as a fat animal can. That is simply my own opinion, but it sounds reasonable.

I notice too, that dairy-bred bulls will live for a longer time after they have the disease than heavy milking cows—probably for the same reason. A dairy bull simply takes on flesh, not so much flesh as a beef animal, but dairy-bred bulls, I find, can be kept for a number of years after they react to the disease. And where they have valuable breeds, it is certainly a shame to have them slaughtered.

A few years ago, at the Minnesota University—if you will pardon me for giving this little illustration—we had a very valuable Angus bull that reacted to the disease. We put that bull in quarantine, and held him in quarantine from the time he was a calf until he was a mature bull. He reacted every year. He apparently had the disease, but got no worse. Finally it got to the point where I was afraid he would go to the tank, and rather than lose everything, I sent him over to the stockyards. If Dr. Boyd is here, he will tell you that there was found only one slight lesion, and that bull had been in quarantine for several years, and was a valuable bull. It was too bad we did not keep him longer, as we would if we had only known. At the Nebraska University we had another bull of the same breed, which reacted, and we put him in quarantine and held him there for three or four years. He kept in good flesh all that time, in practically show condition; and yet when he went to the slaughter house, he went to the tank.

So you cannot tell from experience. We have in our own herd over in Michigan today—and Dr. Dunphy will bear me out in this, because he has seen the heifer—a heifer that has been quarantined for four years. She is in show condition, and has had no grain for two years. I will say this, though, that she has not been a regular breeder. We have kept her because she is a valuable animal, and we have been hoping to get a calf from her; but I am afraid we will have to give it up. We think she is pregnant now, but it is questionable. Another cow in the same herd has been in quarantine for four years. She has produced four excellent healthy calves, regularly. It would have been a very great sacrifice to us if we had been forced to have that cow slaughtered, so I want to say this: When you are dealing with these pure-bred herds, use every possible precaution, and first have in mind the broad general interests of the country at all times. I do not believe any of you will take exception to this, when I say that if a man is willing to keep reactors in segregation, if he will do it well and do it carefully, according to instructions, it ought not to disqualify him from keeping his herd. The disease is so prevalent that if we should require a large number of animals slaughtered, we would certainly be in a bad way, so far as the breeding interests are concerned.

This plan might not be advisable with the ordinary farmer, but you must remember that when you are dealing with the breeders of pure-
bred cattle, you are dealing with a class of men, who, I think, are a little higher in intelligence than the men who are handling just common cattle; and I think that you can safely trust most of them, and be sure that they will use every possible care that you ask of them; and if they do not use that care, you can easily strike them off the list.

The breeders are getting very much interested in this accredited herd system. They are not showing the antagonism that they have shown in the past. I believe they are going to show a very friendly spirit in trying to comply with these regulations, and we must have the best kind of co-operation between the breeders and the veterinarians, if we are going to get the results that we hope for. I thank you for your attention.

PRESIDENT WILLS: We will next hear from Dr. Peters, state veterinarian of Illinois.

DR. A. T. PETERS: Mr. President and gentlemen: I surely have been pleased to listen to the good papers here this afternoon. I have had occasion to attend gatherings of this kind for many years, and I cannot recall a time when we have had such wonderful papers as we have had this afternoon. Dr. Kiernan spoke of the work of eradicating tuberculosis, and he meant just what he said. That means a great deal to us. I remember the time when Butler, and men of similar caliber, talked to us about tick eradication, and many of us who were in the audience, who were not so well acquainted with that work, thought that it was a physical impossibility. So many of us probably were thinking today, while we were listening to Dr. Kiernan, that this is something that we may never realize. But I believe that we are going to do some very good work, and accomplish some wonderful results along this line. In the state of Illinois Dr. Dyson started the accredited herd system. These accredited herds are growing, so far as we can tell, from that humble start, so that, from the applications that we have received we will have added to them within the next three months, if the herds will pass inspection, some 35 more accredited herds in the state of Illinois—due mainly to the missionary work of establishing these herds throughout the various parts of Illinois.

Now, I am a firm believer in the accredited herd system. I believe just as Dr. Kiernan and Mr. Russell have emphasized here, that we must have some uniformity in this work. This, I believe, can be accomplished in a body of this kind. With the accredited herd system, and the system that is being inaugurated in a number of states since the last meeting of the Sanitary Board, requiring the 60-day retest, I believe a great deal of good is being accomplished. I do not think, with the 60-day retest and the accredited herd system, you will have to have a black list, as Mr. Russell and some of the others have suggested at various other meetings.

I was interested in Prof. Smith's remarks relative to tuberculosis in hogs, the prevalence of tuberculosis in hogs from various states. I have been a feeder of hogs for the last five years on a large scale, and it may be of interest to know that in 1914 I had to abandon purchasing hogs from two states, because of the large percentage of tuberculous hogs that we received from those states. So, since 1914, in all our operations, when we had never less than between 8,000 and 11,000 heads of hogs on feed, we had to abandon—no matter what price we could secure the hogs at or how great the need—the idea of purchasing hogs from those states, on account of the large percentage of tuberculosis, which ran all the way from 35 to 60 per cent.
Dr. Kiernan spoke about garbage-fed hogs. The feeding of garbage to hogs should be rigidly prohibited, unless the garbage is sterilized, because when hogs that have been subjected to a tuberculin test, and found free from tuberculosis, within three months, after being fed on the best garbage without sterilization, will develop from 10 per cent to 25 per cent of reactors—or, not reactors, but on postmortem examination you will find that percentage of animals infected, it shows that some regulation should be adopted to prevent the indiscriminate use of garbage without sterilization. The great problem that concerns one who is testing a great many herds is the question of what to do with the reactors.

All of the speakers have touched upon that question. In these days, when cattle are so high, with a herd worth all the way from $25,000 to $50,000, it is quite a problem to know just how to handle the reactors; and that problem should be and must be taken up by an organization of this kind. I believe that the experiment stations and the laboratories connected with the various sanitary boards, should make careful examinations, and experiments, in determining whether these reactors that are valuable and might be made useful in the herd, are really spreaders of tuberculosis. This is a problem that has not been given sufficient attention and thought in this country. It is one of the things that should be taken up by the various stations and the sanitary boards throughout the country, so that we may be reasonably sure as to the best way to handle the reactors on a farm. But I feel certain that great good is going to come from the work that is now being undertaken by all of the states in seeking uniform laws and more educational work in the line of tuberculosis eradication. I thank you.

PRESIDENT WILLS: Next in order in the discussion is Dr. J. A. Anderson, state veterinarian of Nebraska.

DR. J. A. ANDERSON: Mr. Chairman and gentlemen of the convention: The elimination of tuberculosis from our domestic animals is getting to be a subject of universal concern. A few years ago in Nebraska we were not worried so much about this as we were about some other things. Nebraska, of course, was largely range country a few years ago, but at the present time our range country is very limited. A great many of the farmers of Nebraska are gradually going into the dairy business. A great many people in Nebraska, who own little tracts of land, perhaps only a section of land, are raising a sufficient amount of feed to milk from a dozen to two or three dozen cows. This has made a great demand, of course, for dairy cattle, and as Nebraska could not supply all of this demand, we have been compelled to go outside of the state to buy them. In doing this we find that a great deal of tuberculosis has worked into our herds. A larger per cent of our cattle in Nebraska are now affected with tuberculosis than ever before. At any rate, it has grown to the extent that it has become alarming, and the Live Stock Sanitary Board is confronted with something pertaining to it every day, and many times a day. So it is very evident that something must be done. Just how to go about it is a proposition that concerns every one of us.

Without knowing until the day before yesterday at noon that I would be here, I did not prepare any list of statistics, of figures and facts, or I might probably have been able to show your some that would be interesting. I realize, though, that it is not very satisfactory to listen to a person quoting off hand too much. You like to have the real substance of an investigation, and not have too much
guess-work. But, as I appear before you, I will have to resort somewhat to guess-work, but I will try to make my estimates conservative. It is a fact, I think, that if we were to rely on the tuberculin testing that is being done throughout the United States, we would find that it is not a safe thing, under present conditions, as we find them, to rely on. Something more must be done than just simply taking a tuberculin test, as is offered us by the various veterinarians of the country, and sent in for us to accept. The situation has compelled us to seriously consider the advisability of establishing accredited herds. We have since the first of August forbid pure-bred cattle coming into the state, except under quarantine, subject to a test after 60 days. This has afforded protection of some real value.

It is a fact that we are getting tuberculous cattle from places where we least expected to find tuberculosis, and that has led me to believe that we are getting tuberculosis to the extent that many of our herds that were thought to be effected with contagious abortion, were perhaps not so much affected with contagious abortion, as they were with abortion from tuberculosis. We believe that the herds that are affected largely with abortion are more or less affected with tubercular lesions. We find on postmortem that this is an actual fact, and we have no good reason, at the present time, at any rate, to accept any other theory. In hunting around and trying to make certain that we were not being treated fairly with this test, we have resorted to these second tests, or retests, as we call them, after 60 days; and in furthering that test, we have added a little to it. I do not know whether anyone else is doing this or not, so I will tell you about it. I got the idea perhaps a little over a year ago, that by adding an extra dose of tuberculin on the second day, say about 20 hours, or any time from 10 to 20 hours after the first injection, and continuing to take the temperatures, we would find more tubercular reactors. This has proven very satisfactory. In making a number of tests at the different state institutions, I would say offhand that we have found about 30 animals out of perhaps 500 tests. Now those 30 animals were animals that would have otherwise escaped being branded as reactors had we not added an extra dose of tuberculin. After we were absolutely sure that this method was of some value, we followed these animals to the packing house, where they were slaughtered, and found that they showed postmortem lesions. This is no supposition, you understand; this is real fact. This has aroused my suspicions more than ever about the tests that we have been presented with, the tuberculin tests that have been made by veterinarians—and I am not questioning their honesty; but we have sent many men from Nebraska to Michigan herds to make tuberculin tests, and they did the work to the best of their ability—we have no reason to doubt that—but they brought back tubercular cattle with them. It is very evident that there is some plugging and doping at the time of testing, and that makes it a mighty dangerous piece of business to venture upon. It is a very hard matter for me to criticize this situation, and do it without hurting somebody's feelings.

Only a few days ago I was notified that I would have to apologize for some of my reckless speeches—which I have no notion of doing, however. I made a statement that some of the crooked cattle dealers of the country were hiring veterinarians to do these things, and were plugging and doping at the time of testing. Now, when I say that I do not mean anybody but the crooked cattle-dealers. I simply mean that such a thing exists. I mean also, in connection with
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this, that we have crooked veterinarians. I do not think that veterinarians are anything else but human. Of course, we have crooked ones, and we would not expect not to have them. If we did not have them, everybody would want to be veterinarians after a while, and I do not see them reaching that way yet. So we have no reason to doubt that both parties are to blame in this matter; but how to get at the facts in the case, how to wipe out this undesirable product that is pushed onto us as high priced stuff, is a proposition that I really came here today to get some information on, and to learn about.

If it is possible to establish an accredited herd system, which seems to be logical, let us do it. Let us resort to every possible means of testing, and having postmortems, and doing everything possible to get down to the facts in the case. I am not opposed to blacklisting. I am not in favor of punishing anyone unnecessarily, but I am in favor of doing anything that will get rid of some of the crookedness and unpleasantness that we are confronted with. It is a fact that if a man goes out and injures or murders another man, he will be punished for it; but a man may go out with a lot of diseased cattle, and murder an entire family, or a whole community, and get paid for it, and we are parties to it. Now, if we can in some manner establish an accredited herd plan, establish among a number of different states a testing system, after holding them 60 days, and giving them time enough to sober up from the juggling, doping and plugging they have had, we will scare a few fellows out of business. I have seen a few of them scared out already, and I have some things up my sleeve yet that I think will scare some more.

There is no use in one man or a few men trying to handle a proposition of this kind by themselves. The thing for us to do, if I have the right idea, is to get together. I do not mean by that, that a number of states agree on an accredited herd plan, or agree on a system of testing, whether 60 or 90 days, or what not, but I mean that we should not establish a thing of this kind without having it pretty uniformly distributed over the stock-growing country and stock-growing states in the Middle West or the West and Northwest especially.

We are confronted at this time with a great many different interstate and state regulations, interstate shipping regulations, etc. We who are in the business, who sit at our desks most of the time, trying to find out how best to send stock from one state to another, hardly know what to do. I have been asked to act as a committeeman on a number of occasions, to draft some uniform shipping regulations, interstate regulations, but have never been able to accomplish anything. I am willing to take my share of the blame. It is not your fault any more than it is mine, but it is the fault of all of us.

In establishing an accredited herd plan, let us not allow this mistake to get in. We have gone so far, as I say, as to establish the 60-day testing, but we have not established at the present time—that is, we have laid down no rules for establishing—an accredited herd. Some of our people have wanted to have their herds placed on the accredited list. I have asked them to just be patient until I could first get the ideas of the Bureaus of Animal Industry of other states people who have thought on this thing more, and have had a little more experience; and they have all consented to do so. The Livestock Sanitary Board of our state is working with every business man they can interest in it, and I think that every man in our country who has any honor and honesty—and we have many of them—will be perfectly willing to abide by anything that we can decide upon, that will be fair. I do not
think we will have any trouble in having such a plan approved by the stockgrowers of Nebraska, and I do not think we will in any state. I feel that if we could all get together right now, while we are here, while the meeting is in session, if we could bring out all these different ideas and get together on some plan, I think we could start this thing right now, and then perhaps a little later we could iron out the interstate regulations that are making us so much trouble.

MR. G. W. TUTTLE: Mr. President and gentlemen: When Dr. Wills asked me to come out here to speak to you about bovine tuberculosis, I did not think that I could do you much good. The experience that I have had has been limited to one herd, and while it has been a relatively large herd, in many ways my experience has been different from that of others. Our herd consists of about 800 head of dairy cattle. For the last 12 years I have been in charge of it. When I went to this herd it had been carefully tested for ten to twelve years before by the best veterinarians in the country, but there was still tuberculosis in it. I had had experience in a small herd of from 100 to 150 head of cattle, where we tested carefully, and cleaned out the disease. When I went to Briarcliff, I said: "We can clean out the disease here."

I believed then that if the tuberculin test was properly administered and properly interpreted, it would remove every animal that had tuberculosis, and I believed that right up to four years ago. Now I believe it is the best diagnosis that we have, but that it will not accomplish everything.

You have got to go a little farther; and if you will just give me your attention for ten or fifteen minutes, I will try to sketch to you the history of our herd for the last twelve years, so far as tuberculosis is concerned.

In the first place, this herd was founded by a wealthy man, whose first thought was to have clean milk for the babies in the city of New York. He made up his mind that in order to do so properly, he would have to raise his own cows and produce his own milk. While he has wanted to make his herd a success, his main thought has been to have healthy cows. His endeavor has been to get a clean herd. We even went so far as to buy farms in another section of the state, and build new barns there. We thought the disease might be in the old barns, so we moved. We had a most careful test made just before we moved, thinking that we would go into the new place without a single cow showing any signs of tuberculosis. I think that we came pretty nearly doing it, too.

We built three large barns in three different places—200 stanchion barns; and we had a dry barn. In making certified milk as we do there is quite a lot of extra expense added in the way of cleanliness, etc., and that leads the certified men to keep only the milking cows in the certified barns, and have a dry barn for the other cows.

Now, that will work out all right if tuberculin picks out every animal that is tuberculous. In our desire to interpret the test correctly, we made up our minds that we were not testing often enough. Instead of testing every six months, and getting a line not only on reactors, but on suspicious animals, we decided that we would test every three months, and we would put the reaction after injection at 103, and we would even call that animal a reactor. We weeded out a great many of them, but still on every test we would have 5, 10, 15 or 20 reactors. For two years, when we were testing every three months, our reactors started in something like this:
On the first test, 29 per cent; on the next test, 11 per cent; on the next test, 6 per cent; on the next test, 4 per cent; on the next test, 2 per cent; and then 0.6 of one per cent.

We thought we had the thing under control. We thought we were cleaned up. We waited five months and we got 1.3 per cent reaction, and we felt all the more sure. We waited 12 months, and we got 25 per cent, and finally we got 36 cases.

Now, all the time we were trying our hardest to take care of things right, and we did not know what to do. Our herd got so small that we had to get more cows. While we were looking over the different breeds, somebody told us they had been up in Canada and bought some grade Ayrshires up there, and they had tested them, and they came down all right. I thought I knew something about testing at that time, so we went up there and got 218 head, and tested them, and there was no crooked work about it. We brought them home, put them in a barn, and kept them by themselves; and in six months 85 per cent of them reacted. That is what you get in buying cows. I do not think it is so much the dishonesty of the veterinarian, or perhaps the owner. It is simply the unreliability of the test, under the circumstances.

Well, we went along, and did everything that we could. Finally, in talking with Dr. Moore one day about infectious and contagious diseases, he remarked that he thought that each disease had some main channel of infection; that there was some main channel by which any disease was transmitted from one animal to another. That set us to thinking. Our barns had a common manger, and a common watering trough, and we had 50 cows eating and drinking out of the same place. We had it wide open, so that we could clean the thing carefully. Well, if the main channel of infection in bovine tuberculosis were through the mouth, that certainly was a beautiful way of spreading it. So we put partitions between our cows, arranging it so that the cow in one partition could not get any feed or water from a neighboring partition. In one barn we separated them into individual stalls, and in two barns we had them arranged in pairs, two cows to a stall. There was no way, unless somebody deliberately took the feed and water from one stall and put it in another stall, that the feed or water from one stall could go to another.

We had a test after that, and got 11 per cent reactors. We waited six months and got 4 per cent. We waited another 6 months and we had 3 or 4 per cent, but one barn was cleaned up altogether. I forgot to say that in making these partitions, we did away with the dry barn, and put each cow in an individual stall, and planned to keep her there as long as she stayed on the farm.

We found this rather successful, and, as I said, one barn was cleaned up after two tests; and on the 23rd of November Dr. Leach, assistant veterinarian of New York state, finished tests at our farm of 753 head of cattle, and only found six reactors, with none in one barn. The reactors were all in the other two barns.

It seems to me that, from our experience, the tests, properly administered and properly interpreted—and I could show you figures that would startle you—prove that the main channel of bovine tuberculosis is through the mouth; and if infection by that channel is cut off, anybody can clean up his herd.

The only thing that bothers me is, although we have one barn with no reactors, after testing for some time every six months, we still get a few reactors in the other two barns. It would seem that if five tests,
cleaned one barn, it ought to clean the other two; but I think the difference is due to the unreliability of the tuberculin test—that is, in regard to the negative results.

In all the testing that we have done, we are posted enough to know that when we get a reaction, we are sure of the disease on post-mortem, but we do not know about the disease in the cattle that never have reacted. It took a lot of courage on our part, when we were continually getting reactions, to say, "Now, I do not care whether that cow there has reacted or not. Take her out and kill her." After we got started, we had to kill quite a few, but fortunately we were able, twenty-four hours after a certain test, to take out the animals that looked all right. In one case a cow went through 15 tuberculin tests, and when we took her out and opened her, she was a beautiful specimen. In that way, we were convinced that there was such a thing as a negative result.

We have not cleaned up the other two barns yet because of those negative results, because there are cows that, in spite of all our testing, still have it; and I suppose for the next few years an occasional cow will have it. But I think I am almost safe in saying—that under our method we will never have an outbreak. If that is true, that is the way that the whole business can be handled, and accredited herds can eventually be established all over this country. If men are willing to do it, there will be no trouble about carrying the thing through.

In the meantime, we have been raising our own calves, and we have been raising them carefully. We have had no reactions in the young stock, which have been kept in a special stock barn, since June, 1914. We have on the place today about 460 young stock. During the past year 162 heifers entered the herd, and the year before 147, and the year before that just 100, and the year before that 55. That shows that we are raising young stock successfully all the time, and we have had no reactions in them since June, 1914. We think we have discovered the way to handle this. At any rate, we hope we have. In closing, I want to tell you that I have been able to come here and tell these things to you, because it is most encouraging to us to think, after all this time, that in a large dairy herd we have apparently found some way of controlling the most insidious disease we know of.

Chairman Wills: The subject is now open for general discussion.

Dr. Gibson: I would like to ask Mr. Tuttle for a little information regarding his plan of cleaning and disinfecting the barns originally and subsequently—that is, the stalls in which you found the tuberculous animals?

Mr. Tuttle: We have adopted within the last few years a system of disinfection that is nothing more nor less than soap and water. Every winter we used to lose a large number of calves from scours. We never lost any during the pasture season, but after the first month of winter a lot of our calves died from scours. We tried everything we could think of, calf serum, normal blood serum, and had the best advice we could get. Still it would continue, until we got the idea of taking the pregnant mother, say about a week or ten days before she would calve, and washing her from head to feet with soap and water, scrubbing her well, and then putting her into a stall that was disinfected and cleaned as carefully as we could do it. In disinfecting the stalls, we have used whitewash, formaldehyde, quicklime, and everything we could think of. The main thing is to get the stall as clean as possible, and not put the mother in until she is about ready
to drop her calf. After we got that system going, scours in calves stopped. It was just the cleanliness that saved the calves.

Well, that result was so good that we went on to something else. Like most of you, we had some abortion, and when our scours stopped, we thought that if we would clean everything up that way, it would have a tendency to check abortion. So now every month at least, and usually every fortnight, we take every bit of bedding out of the barns—out of the milking barn—and of course everything out of the troughs, and we scrub every cow thoroughly with soap and water—a good strong solution. We put in a little coal-tar disinfectant just for the smell, because we have found that the men who are doing the work, if they can smell the disinfectant, believe it is doing a whole lot more good.

In washing a cow, some soap and water gets in the manger. We have our feed and water in the mangers just as we did before. So in order to get the manger so that a cow will eat and drink from it, we have to get the soap out of it. It has to be washed out, so the men clean it out, and clean out the gutters, and clean the whole barn that way. I forgot to say that each one of the cows in each individual stall has her own broom. One of the hardest jobs we had was to persuade the men to use each broom for a particular stall, and put it in that stall, and not use it in the next one, or across the way. At one time in one of the barns we had a test, and found we had four reactors. They were separated, two on this side and two on that side, right across the feeding alley, with their heads about fifteen feet apart, and that led us to suspect that the Polock, who did not understand English very well, who had that section to clean out, was interchanging brooms because they were all two-year old heifers. Most of our reactors now are older cows, that probably have had the disease for some time, and it just cropped out at the time we happened to test them.

DR. MAYO: Mr. President: It seems to me, in dealing with one of the problems in connection with tuberculin testing, namely, that of illegitimate testing, that it can be handled through the sale of tuberculin. I do not think tuberculin ought to be sold on the open market, and I do not think it ought to be supplied, except through regular official channels; and that that should be of a certain standard, recognized by the Bureau of Animal Industry, if you please. As it is now, practically anyone can procure tuberculin at any time. Since tuberculin is not a curative agency, but only a diagnostic agency, in my judgment, it ought to be supplied only through official channels.

Mr. Tuttle's talk on tuberculosis is one of the best that it has ever been my privilege to hear, from a layman or a professional man either. There are many of us who have been through the same difficulties he has gone through, and we certainly appreciate the information he has given us.

PRESIDENT WILLS: I know there are many others here who want to talk on this subject. The meeting is open.

DR. C. A. CARY: Mr. President, I just want to say a few words about uniformity. We have had this subject up before this association for a number of years, and have not done anything. I have a plan which may not be the best, but I believe it will work. There may be something better, of course. The plan is this: Let the Bureau of Animal Industry work out a full system for testing. Let that system be designated in full and in detail, also let it designate what shall constitute a tuberculin test. Then let any state board that has the
power to adopt it as a regulation of the board, adopt it, and stick to it. This will simply put the question of tuberculin testing on a uniform basis, and we will not have one state reading the test one way, and another state reading it another way, and one state adopting one system, the subcutaneous, the intradermal or ophthalmic. I realize that it will be impossible to satisfy all of the men on the respective boards; but I think that at least this will be a starter toward uniformity, and in the end we will eliminate these irregularities, and finally establish a uniform standard. I do not believe that we are going to work this thing out in a short time, it may take a few years, or a series of years. I do not believe that a body like this can go into session and determine offhand what is best. I think, however, that a committee, or the bureau, can frame a foundation, which we can adopt, and in that way work toward uniformity, and stop this continuous cry of the stock men all over the United States, "What shall we do?"

I believe that this is a thing we should look into, and look into just as soon as we can, because if we are going after tuberculosis as we should, we must have some standard that is reasonably safe for every state.

MR. TUTTLE: I think that the doctor is right in what he said. I think that there ought to be a standard tuberculin test. But I have missed my point completely if I have not brought to your attention the unreliability of any tuberculin test, so far as absolutely cleaning up the herd is concerned, or making it sure that any cow that has passed the test is absolutely free from that disease. This is the point you must not get away from—if you will allow me to talk to you professional men that way. For Heaven's sake, get away from the idea that the tuberculin test is going to show that any cow has tuberculosis. We know it is about 75 per cent accurate on positive cases, but how do we know to what per cent it is accurate on negative cases, that is, on cows that do not react? There is the trouble in protecting your herd; there is the trouble with shipping your cows all over the country. This is why veterinarians and stockmen are being called crooked rather than because they have been spending money or been given money to do certain things, in my opinion. So we must get away from the thought that the test is a positive diagnosis. We have been handling cows long enough to know that the test is not a positive diagnosis, no matter how it is interpreted, and no matter how administered.

DR. O. H. ELIASON: Mr. President and gentlemen: I am very glad that somebody outside of the profession has had the courage of his convictions to come here and tell us some of the things that we have heard this afternoon. I will not go into detail in this matter, but I want to say to you that the longer I study this matter, the less I think I know about it. We made a test on about 150 head of cattle a short while ago, which the owner had submitted to the tender mercies of our department for experimental purposes. We wanted to determine the relative value of the three tests: ophthalmic, intradermal and subcutaneous. The subcutaneous was used first, with the result that we got about 8 per cent reactors. That was followed by the ophthalmic, in which we got about 25 per cent. We got about 18 cows that did not react to either of those, by the intradermal. There were about 47 reactors in all in the herd, to the various tests, but only 10 of them reacted to the original subcutaneous test. What would have been our position if we had relied on the subcutaneous
test alone in that instance? This herd had been tested before. It has been pretty well demonstrated to us that the sensitization of the animal is essential in getting a reaction. I believe that the results would have been just as good with the subcutaneous test in this experiment if they had been reversed. I think that the last test—they followed within ten days, all of them—had the best chance, because the animals were being sensitized, and we were getting a reaction which we would not have been able to get if the animal had not been sensitized through the tuberculin. This has been tried out in a number of experiments, which unfortunately I am not prepared to report on at this time.

As to the accredited herd, I hope that it will not be the conception of this body, or anybody else, that accredited herds will be of such a Simon pure character that we can send them forth without any reservation. Gentlemen, tuberculosis will be in your midst every day in the year. If you will just keep that in mind, it will save you a lot of lying awake nights. I will say, however, that if the initial test is clean, and if there is no introduction of new animals into the herd, you are going to succeed for a longer time in keeping tuberculosis out of that herd. But the interchange of cattle is going to bring tuberculosis, no matter what precautions you may take. I can substantiate this by hundreds of instances that have come to my notice, but I do not want to discourage you.

Let us get together, and not say too many harsh things about our brother practitioners, because we will have to take back some of them. We will be sorry before we get through. I have said some things in the past that I would not say now. True, we have some unscrupulous men who will not get up in the small hours of the morning to take a temperature, but they are exceptions, and very rare exceptions. You can catch them if you just get up in the morning yourself and go out, and work along with the ophthalmic test; and you will get them before night. It is an easy matter to weed out the undesirables; and if you get busy and clean up your own ranks, you will have no further trouble. When the veterinarian finds you out with your tuberculin, doing your own testing, and you find reactors right behind him, your neighbors are going to sit up and take notice.

When I go out to test a herd of cattle, the worst thing I have to contend with is the prescription. Here it says, "Two cubic centimeters," nothing more goes into this herd. You must test them according to those rules, or you cannot test them. What are you going to do? We had a fight on that, just over the rules, just because there were a lot of things prescribed which we could not use in a particular instance. Now, for goodness sake, do not let us tie up our men with a lot of prescriptions for testing; if a man who goes out to make the diagnosis has not the brains to do it himself, then keep him at home.

As to the accredited herd, you want to remember that we are tackling a big proposition. In the state of Wisconsin we have over 4,000 pure-bred breeders, and that means a lot of testing. We must have the co-operation of the veterinarians, of the owners, the private practitioners, and the men in public service.

To get down to some basis where we can do something, the best way would be to tell the breeder: "When you think you have a herd which is clean, or which your veterinarian thinks is clean, come to me and show your records, and if the history is all right, if there has
been no previous history of tuberculosis in your herd, or if the last two tests have been negative, and you have taken various other precautions which have been already enumerated, well and good. We will certify to that."

Now, let us say, for instance, that the state and the government will have a check on this matter. Supposing that the owners and the veterinarians know that we have a bunch of men who will go out and check-test these herds, at a time known only to our department; then if any complaints come in on any of these herds of cattle, let the department go out and make its examination. It would seem to me that we could put all of the responsibility that is necessary on to the breeder. In working this out, let us tell the people that we are going to do everything we can to make them safe, but that mistakes and accidents may happen in spite of all we can do.

As to the disposition of the reactors, this is the kernel in the nut. If attempting to clean up a county of tuberculosis, and you find quite a number of herds in which there are over 50 per cent reactors, are you going to take all of those cows out of that county at one stroke and put them on the block? Is that an economical procedure? Would it not be better if you said to those men: "We are going to test out all of the herds in this county, but do not be alarmed, if you do have bad luck, if your herd reacts, we will help you along. We are not going to put you out of business, but we are going to help you along. We are going to show you how you can get out of this to the best advantage. We will let you keep your herd in quarantine, providing, first, that you safeguard your neighbors who have clean herds. Second, that the milk from this herd be safeguarded by proper treatment before it is used in the trade. Also, that you will not distribute any of these cattle to any of your neighbors until your herd has been cleaned."

I believe that if we had started that propaganda some years ago, we would have taken the wire edge off some of the dread that now accompanies the tuberculin testing of a herd. When you go to a man, and practically take his whole herd at one stroke, and not only his herd, but those of a number of other breeders in the same community, you can readily see that there is going to be a storm of protests that you will not be able to overcome.

These things have been tried out before, in our enthusiasm let us not start with any proposition which is going to make trouble for us. These things have been tried out before. The killing idea has been tried before, and it is a failure over a large area, where there are a large number of animals involved. Where a man has the money to replace his herd, it is a different thing. But when the man is a poor renter, and the herd you take away from him constitutes practically everything he has in the world, the proposition is very different.

I want to leave that thought with you, and I want to tell you that the disposition of the reactor is the whole thing in the eradication of tuberculosis, and before we begin that, we must have a definite system of taking care of those people who have a large number of reactors, and show them a way out, other than to destroy the majority of the herd at one time, I mean the productive animals, of course. The unprofitable animals may better be slaughtered.

DR. J. I. GIBSON: Mr. President, I wanted to ask the doctor one or two questions. I would like to know how soon after the subcutaneous test you applied the ophthalmic test to this herd?
Dr. Eliason: At any time within ten days, or not later than fifteen days.

Dr. Gibson: I was asking when you did it; not when it may be done, but when you did it in this instance. Did you test the whole herd each time? And then how long after the first test did you apply the ophthalmic test? I wanted to get that?

Dr. Eliason: On the day after the day following.

Dr. Gibson: I want to get that into the record. Then how soon after the ophthalmic did you apply the intradermal?

Mr. Eliason: I think I will have to correct the record on that. If I remember exactly, the intradermal test was made first, or, was injected, rather; and five days later came the subcutaneous, and the day following the subcutaneous, the ophthalmic was introduced.

Dr. Gibson: Then according to this record, you have the intradermal test credited as the first test?

Dr. Eliason: Yes.

Dr. Gibson: And did the intradermal test give a reaction on the ones that the other two tests pointed out, or did it fail to give a reaction?

Dr. Eliason: There were, I think, two that reacted to both of those tests, and the others that reacted to the subcutaneous had not reacted to the intradermal. The balance of the herd reacted to the ophthalmic test.

Dr. Gibson: And how many of them were slaughtered?

Mr. Eliason: About half of them were slaughtered. The rest of them were placed in quarantine.

Dr. Gibson: And what did you find?

Dr. Eliason: Lesions in all that were slaughtered.

Dr. R. J. Donohue: Mr. Chairman and gentlemen: I am from the state of Washington, where we have had a great deal of experience in using the intradermal test. I think that this year we will have used it on about 50,000 cases. We have three men who spend their entire time on this work. I myself have been in the field for about two years, applying this test. In making this test, and comparing it with the subcutaneous test, the other inspectors on the force and I have used it in every conceivable manner we can think of, in checking against each other. Our experience has been, and we are all a unit in believing this—that neither test is absolutely reliable; and, as Mr. Tuttle has said here today, those reactors that remain are the ones that give us trouble afterward in our work. When we first started it was currently reported that you could plug cattle against the subcutaneous test, but not against the intradermal test. That is a mistake. We have a herd that I might cite at the Western State Hospital for the Insane at Tillamook, Washington, that have been tested on four or five different occasions. We know that those animals are reactors. I myself tested about 30 of the animals, quoting this off-hand, and not having the figures with me—with the subcutaneous test, 4 cc. of Bureau tuberculin being used. All of those animals, with the exception of two, I believe, reacted to the subcutaneous test. Immediately on finishing that test, I applied the intradermal test, and there were only three animals in that entire herd that I would have called reactors. We who are doing this work all the time, consider all animals reactors to the intradermal test that show anything different from the normal; and that is where most of you who are using the test make a mistake. Your reaction does not
have to be as large as an egg, but if it is as large as a parlor match head, it is a reaction, and you can depend on it.

That is just what will happen in running those tests together. Anyone who applies the subcutaneous test, following it immediately with the intradermal test, is going to have trouble, and then will blame the intradermal test, and I believe that in a great many of our other tests, where we blamed the subcutaneous, it was because we used the intradermal before, and blocked the other.

Dr. C. A. Cary: Mr. President, may I just have another word? I do not want you gentlemen to think that I regard anything in medicine as a mathematical certainty. But we are going to adopt and hold a standard tuberculin test as the best test that we have for tuberculosis. It is going to be the standard by which we will check animals from herd to herd, and from state to state. The evidence given today shows what a multiplicity of methods of interpreting and testing there are. So long as we have this condition we are going to have variations in the result.

In my state we are buying a great many cattle for establishing new herds, and we are getting a good many tuberculous animals. They have been tested, but on a second test we find that they have tuberculosis. Nevertheless, I still believe the tuberculin test is the best method we have of determining whether an animal has tuberculosis or not.

If we have the best method, why can we not establish a standard? This gentleman from Wisconsin made a test in one way for himself, but in testing animals for shipment we ought to have a uniform standard.

I do not believe that any man, any veterinarian who has done any testing at all believes that tuberculin is an absolute test. For years we have been recording a certain percentage as error. Much of that, probably, has been due to misinterpretation, and the use of different methods. We must abandon the idea that anybody can test cattle, or that any veterinarian can test cattle. We must give up the idea that we can test in a haphazard way, that we can read temperatures in any old way, and that we can test it with very little work.

We want to get definite results, and results that will stand comparison. But no comparison can be made where one man does one thing and another another, and one state does this, and another state does that.

Let us establish an accurate and absolute system to begin with, and out of it will come more or less accurate results, and that is what we want. I do not believe we will find a method that will give us uniform results at once. But if we can get the majority of them, that is what we are after. That is why we need to put the tuberculin testing on a standard basis.

Dr. W. J. Butler: Mr. President, I would like to ask Dr. Kiernan if the regulations which he spoke of relative to accredited herds have been adopted by the Bureau of Animal Industry, and if so, if they are final?

Dr. J. A. Kiernan: Do you want me to answer that?

Dr. Butler: Certainly, if you please. I have a lot more.

Dr. Kiernan: As was stated in the paper, these were proposed regulations.

Dr. Butler: Proposed?

Dr. Kiernan: Yes. The Bureau feels that it is entering on a great
campaign. We have no system which we can present, saying: "Here is an absolute rule by which to eradicate tuberculosis." If we had such a system, it would have been put into operation years and years ago. We are using our best endeavors to cope with the situation, with the firm belief that from this work we will evolve a method that will get us somewhere; and combined experience and wisdom will from time to time suggest changes for the perfection of the system; and who can tell but what some day a system will be evolved that will be just as effective in eradicating tuberculosis as the system now in operation for eradicating the tick?

The Bureau is not laying down any rules, and saying: "Here is what you must go by." The Bureau came here with an open mind, to take counsel with the representatives here present, and attempt to establish some basis that will be for the upbuilding of the live stock industry of the country, and if in a year or so changes are necessary, we can easily make them.

The Bureau feels the same way as to the different methods of testing. In its experience it has obtained the best results with the subcutaneous tuberculin test; but at more than ten or fifteen places they are experimenting now with the different methods of tuberculin testing, with the hope that the very best method possible may be evolved.

DR. BUTLER: That does not just answer my question, Doctor. What I am trying to find out is, are you going to put cattle on the accredited list with one testing?

DR. KIERNAN: That is what the Bureau is suggesting at this time.

DR. BUTLER: That has not been definitely decided yet?

DR. KIERNAN: It has not been definitely decided, no.

DR. BUTLER: Then at the present time, do not know whether it is going to be one test, two annual tests, or three semi-annual tests?

DR. KIERNAN: No, that is the Bureau's proposition. There are probably other propositions that the states will have to make, and the Bureau has an open mind with which to discuss the proposition.

DR. BUTLER: Fine. So that at this meeting, do you think the matter will be decided as to whether it will be one test, two annual tests, or three semi-annual tests?

DR. KIERNAN: I hope so, yes.

DR. BUTLER: All right. Then in this testing they are not going to test anything under six months; is that the understanding? Do not think I am criticizing. I am here for information and I am going to ask you for it. I can tell you right in the start that Montana will not accept accredited herds where only one test is made. (Applause.) I am here for business, and that is why I am asking these questions. We find in testing in the range country that we have lots of animals under six months of age that have tuberculosis. We find that we can go into a herd, and test it out once, and we do not find tuberculosis; but I want to tell you of a herd of 394 cattle in Montana which had been free from tuberculosis for four years; no animals had been added for two years, and the animals had been tested out yearly, some with the subcutaneous test, and others with the intradermal. The herd is in charge, I might say, of two of the cleverest and best veterinarians in the United States, men who are not in the state employ; and just four days before I left, they found four tuberculous animals in that herd. Now, what are you going to do with one test?

Then about the method of testing, as you say, it is going to be the subcutaneous. But we are going to have considerable bad luck in trying to
test range animals with the subcutaneous test, and it means that we will probably work only three or four months in the year. Any animal, whether a range animal, or any other animal taken from the open, and put in a barn, will not have a normal temperature. You are lucky if you get a temperature that is under 103°. You will get them running 103°, 104°, 105°. Now, if the intradermal test is barred, and only the subcutaneous test is going to be accepted, what are you going to do with the range cattle? How are you going to test them. You simply make a farce out of the whole proposition.

And, as Dr. Donohue says, in this intradermal test, not one veterinarian in a hundred knows how to make it. You must educate him. That is one place where our schools fall down, and fall down badly. I do not know of a young veterinarian coming out of school today who knows a thing about tuberculin testing, or the ophthalmic test, or the glanders test. They are sending them out and not educating them. They are taking money from a man and not giving him his money’s worth in return. It is up to the colleges and to the veterinary associations, to see that a young man gets his money’s worth. I am talking from actual facts, and I will prove anything I say.

The question of indemnity has not yet been decided, I presume. There are a great many of the western and northwestern states that have gone ahead, and have for a number of years paid for the tuberculous cattle that have been shipped in to them. There is not a state in the northwestern country that could not handle tuberculosis and handle it easily if we did not get tuberculous cattle shipped in to us continually. You say you are not blaming the veterinarian who makes the test. Well, whom have you got to blame? If he will go out and deliberately pass cattle at a public sale that he suspects have been plugged, why, he is not doing his work properly. It makes little difference to Montana whether a veterinarian is absolutely wrong, or whether he is incompetent, so long as we are getting tuberculous cattle. We are not asking a man whether he is competent or whether he is incompetent. Just now the fact that we are getting tuberculous cattle is enough for us, enough to make us know that we are not getting value received; and I can cite many, many instances.

For instance, I have had 3.8 out of 50 react on a federal test. Is that right for Montana? I do not think so. But it is the system. I am friendly to the Federal Government and the Bureau of Animal Industry, and I do not know of any state that is willing to co-operate with them more and assist them more than Montana. You cannot show me a state that has co-operated with them better than Montana. We appreciate their work. But we have got to get down to brass tacks. The system is wrong. They have either got to get out a regulation saying that no cattle from a public sale shall move into a state, or they have got to go on and distribute tuberculosis all over the United States.

Here is Professor Smith. He talks tuberculosis in range cattle. I think probably we knew about that before Professor Smith did. And where did we get it? From the public stockyards. We got cattle shipped in to us from public stockyards that we checked up on, and we would find from 4 to 20 per cent, and I have found that as high as 60 per cent were tuberculous.

Pure-bred bulls are a source of spreading infection in range cattle. In one shipment from one of the largest range outfits in Montana, the old Pioneer Cattle Company, we found about 8 per cent were tuberculous. The old man who runs that company is one of the finest men
God ever gave breath to, and he immediately wanted all of the range herd tested. And where did we find the tuberculosis? We found it in his pure-bred bulls and some pure-bred cows which had been allowed to run with the other cattle. It predominated there. He had his whole herd tested, and every animal that was found to be tuberculous was destroyed. He absolutely demanded it, and would not take a cent from the state by way of reimbursement. Then another source is these "dogey" cattle which have been shipped into the range. A lot of them were shipped out this year. The result is that today our regulations require that no cow, steer or spayed heifer coming from a public stockyard can come into Montana until it has been tuberculin tested by the federal veterinarian. And yet you want uniform regulations. When will Illinois adopt them? It is not to Illinois' advantage to do so. You have big yards, and we have not. Someone here asked about uniform regulations. You will not have uniform interstate regulation until you have uniform sanitary boards and uniform sanitary laws within the different states. Here you are putting cattle out to feed. You can put them under quarantine, and then when they move you can watch them. We cannot do that in Montana? That is one argument against uniform state regulations.

We are interested in this live stock work, and we want to do what is right, and we want to co-operate with the Federal Government and with every state; and we are simply asking these questions to find out what the situation is. There is no use passing all of these fine compliments among one another, and patting each other on the back, and then going home without having reached a decision. If I have said anything that seemed unkind, it was not in the spirit of malice; but with a desire to do that which will benefit the stock industry.

DR. KIERNAN: Mr. Chairman, so far as indemnifying owners for the loss of cattle is concerned, among the 1,100 or 1,200 cows that were tested in the District of Columbia during the last two years, the plan is to appraise them at $50, and pay 80 per cent. The appraised value is not high enough, but that is the best we can do at the present time. I have a few records here of herds that have been under the observation of the Bureau in the district for a number of years, and they show the progress that has been made in the work among these different herds. I have the records of only a few.

We started testing the herd of Edward Markham December 4 and 5, 1909. There were 29 animals in the herd at that time, 23 of which reacted to the tuberculin test. The premises were cleaned and thoroughly disinfected—every part of the barn and the lot where the cattle ran. That herd has been annually tested since 1909. and not a reactor found in it. That includes the 1917 test.

MR. TUTTLE: You only had 6 left after the first test?

DR. KIERNAN: Yes, sir.

DR. R. J. DONOHOE: That is an exceptional herd.

DR. KIERNAN: Yes. Animals brought into the District of Columbia must be on permit; and the animals are not put into the herd until they are tuberculin tested. Every animal brought into the District of Columbia from any adjoining state, or any other state, must have a permit, and they cannot be put into the herd until they are tuberculin-tested.

MR. TUTTLE: How long do you usually wait before you test them?

DR. KIERNAN: Well, with animals from nearby points, if the owner
states that the animals have not been tested in three months, we apply
a test immediately.

In another herd that of Isaac Miller, in Virginia, when tested in
1907, no reactors were found. It has been tested annually since, and
no reactor has ever been found in that herd.

I will cite an instance something like the one Mr. Tuttle related.
This occurred in the S. E. Thornton’s herd, of Silver Hill, Maryland.
The first test was applied in 1907, and among 34 animals tested, there
were no reactors, but one was marked “suspicious.” The herd was
tested again in 1908 and one reactor found. In 1909 no reactors were
found. In 1910 there were no reactors. In 1911 there was one reactor.
In 1912, there was one reactor. In 1913 one reactor was found. We
find many times that animals are brought into the herd contrary to the
agreement signed by the owner. We also find opposition from the
owners in regard to disinfecting their premises. We also find that in
cases like this, notwithstanding the best attention that can be given to
the herd, a reactor is found after two or three successful tests. That
herd is still marked as a suspicious herd, you see, and we are on the
lookout for a reactor. In another herd belonging to Mr. M. B. Rowe,
of Fredericksburg, Virginia supervision over which was started in
1912, 78 animals were tested, 15 of which reacted. In 1913 there were
12 reactors; in 1914 14 reactors; and at each annual test since then
there have been found 14, 16 and 17. In another herd, supervision of
which was started in 1911, there were 59 animals tested 5 of which
reacted. In 1912 there were two reactors; in 1913 no reactors; in 1914 a
carload of cattle was introduced into the herd, and in the annual test in
1915, out of 66 animals, 53 were reactors. So there are occasional herds
where the results are similar to those cited by Mr. Tuttle. Notwith-
standing the very best efforts put forth to clean up these herds after
two or three successive successful tests, you will find a reactor in the
bunch. But in most of those cases there is a reason for it. Either
diseased animals have been introduced into the herd, or, to begin with,
he has had badly infected premises where the bacilli withstand the
disinfecting. They escape and are in the dust or in the cobwebs, or
something like that, and the place is not thoroughly disinfected.

Dr. Burton R. Rogers: Mr. Chairman: I have just been wondering,
from the discussion, whether there is not another basket besides tuber-
culin in which we can put some of our eggs. A gentlemen over here
a moment ago, stated that there was no other test for tuberculous ani-
imals besides the tuberculin test. Is that absolutely true?

Secretary Houston states that among the hogs slaughtered last year,
9 per cent were tuberculous. In round numbers, 40,000,000 hogs were
killed during the last year and 9 per cent of that number means that
3,600,000 hogs were found tuberculous by government inspectors in the
year 1916. The problem is not with those 3,600,000 hogs; they will be
taken care of. But back on the farms from which they came are the
same old tuberculous cows many of them in bad condition, infecting
another three and a half million hogs right now. While you men are
here discussing this matter for three days, 30,000 tuberculous hogs will
come to the packing plants and before you come back next year there
will be 3,000,000 more.

A good many men have worked along definite lines and found out
certain things. Other men have worked along certain other lines, and
found out certain other things. I think a time has come when we
should get together, and switch onto the same track to reach the same
end, and clear up some of these matters, which are causing so much
human suffering, and a twenty-five million dollar annual loss to this country.

Nowadays many big business houses call in efficiency experts, and very frequently they want a man who knows nothing about that particular business, so that unhampered and unhindered he may study the business from a purely scientific efficiency standpoint.

Suppose that we went up in an airship over the Mississippi River, halfway between the Canadian line and the Gulf of Mexico, and that we stayed up there a whole year; and that while we were up there, we assumed the Godlike power to see the four corners of this country, and to see each and every one of our 6,361,502 farms, with about 71,000,000 cattle out upon those farms and 60,000,000 hogs. On a good many farms there are both hogs and cattle. On a good many farms where there are both hogs and cattle, the hog and cattle either constantly or intermittently associate with each other in the same pens. Before one year from today—since most hogs are marketed at less than one year of age—about 40,000,000 hogs will go to the packing plants, and every one of them will receive a postmortem inspection and there will be found 3,600,000 tuberculous hogs. Every year they have found a number more than equal to those found the year before except once, when they killed 10,000,000 less; however, the percentage went up that year anyway.

For a long time the physicians, doctors and scientists of this country were looking into different things for the cause of yellow fever, and finally somebody found it in the mosquito; and then the Panama Canal was built. Later on the veterinarians and sanitarians of this country were looking at the “mouth” of the tuberculous cow, but it was soon found that the bulk of the organisms were being passed out with the feces. In other words, we were working at the wrong end of the cow. The human physician today examines a person’s sputum, a form of excrement, for the presence of tubercle organisms to determine the presence or absence of the disease, or the stage of the disease. For example:

Supposing tuberculin had never been discovered; supposing the germ of tuberculosis had always remained ultra-visible, as is the case with smallpox and hog cholera. Suppose a human physician wanted to determine in one hundred human cases of suspected tuberculosis whether they were positive or negative. Suppose we knew that sputum was infectious, and we took samples of the sputum of those one hundred people and put each sample into separate bottles. Then supposing we took one hundred guinea pigs, and injected each one of those samples into separate guinea pigs, and then threw the whole hundred guinea pigs into one pen. At the end of a given time, they will either show infection, or they will not. At the end of the time, a month, say, we will kill all of the guinea pigs. We find that 50 have no tuberculosis and 50 have the disease in varying degrees.

Are you any better off regarding those 100 cases of human tuberculosis? No! If any of you who have charge of experiments had a man who would waste one hundred guinea pigs in that manner, you would fire him. It would be absolutely ridiculous. The way you would do would be to label the first bottle “number one,” with the man’s name on it, and the first guinea pig, guinea pig “number one,” so that you could connect and identify both the bottle and the guinea pig; and that is the way you would go right down the line. Then when guinea pigs numbered 1, 25, 30, 40, 67, 66 etc. were found to have tuberculosis you
would come right back to the numbered bottle with the person's name on it and find out who the person was.

But just as ridiculous a thing is going on in the United States of America today in the year 1917. Out on the farms of this country today—and let us catch this point—the tuberculous cows are bringing up this material that comes from their lungs. We know that even if the organisms are injected into the tip of the tail, the lesions will be found in the lungs later on. She coughs up that material into her throat, she cannot spit. She slobbers, and when she coughs there is a cone of spray like we have in the winter time. She swallows the organisms that are in her throat like she does her cud and they pass on through her intestinal tract, which is nearly 200 feet in length, and the organisms pass out in the feces. Schroeder found one cow passing organisms at the rate of 35,000,000 a day. At least that was the statement that he made in a bulletin. I have heard the statement disputed, but that was how it was published. That is one cow, mind you. But out on a farm somewhere—I do not know where, the Government does not know where, you do not know where, and the man who owns the animal does not know himself—is the worst cow. I wish I knew how many organisms that cow is passing. It might be one hundred million, or a billion. No one knows. Hogs, as you know, following cattle, work over the manure, and eat it. The hogs are young and teething and the organisms work up into the lymphatics; and it is a fact that in 93 per cent of the hogs having any tuberculosis at all the submaxillary lymph-node is involved, and 50 per cent of these have the lesions there, and nowhere else.

On the farms, wherever hogs are associating with cattle, those cattle are being tested for tuberculosis, they are not being tested just simply for tuberculin reactors, but they are being tested to find the spreaders, the one giving off the organisms, which create such a serious menace to this country. In other words, the chain runs like this. Healthy cattle—healthy sputum—healthy manure—healthy hogs. Then with tuberculous cattle—and I mean just open tuberculous cattle, and not simply reactors—it runs thus—tuberculous sputum, tuberculous manure and tuberculous hogs. Other things being equal, supposing that you have ten degrees of tuberculosis in ten herds, with the same number of cattle in each herd, and the same number of hogs following each herd, the hogs being of the same age and equally susceptible to infection in the ten herds; figuring each herd as a unit, the hogs will become proportionately affected.

In other words, the more organisms passing out, the more the hogs infected, and the more severe the lesions.

After location of your tuberculous herds what are you going to do? I said 17 years ago, when only 5,440 hogs were found tubercular, that some day the cows that caused the tuberculosis in them would be bought at full market value by the packers. Now, right at this moment, out on the farms, are a definite number of tuberculous animals. No one knows just how many there are, but there are a definite number of tuberculous animals. In the course of time, a definite number of these animals will go to the packing plants, and they will be bought unconsciously at their full market value by the packers. But when the last tuberculous cow gets in which may be 15 years from now, there will still be just as many more out on the farms, due to those that are out there now; and under the present circumstances, these will be bought also in the same way. If a system of marking were put into effect, I believe it would do some good. It is puerile to think that no system of marking can be
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evolved. When you get Yankee ingenuity at work something will be done, even if we have to go all the way from the scalding vat to the scraping machine to work it out.

Suppose a system of ear-tagging and locating of these farms went into effect. We would go out and find an animal in the first stages. Now, if we did nothing about that animal, she would go on year after year, and year after year, and each year she would be a little bit worse producing crop after crop of tuberculous hogs, and infecting other cattle in the same herd by association with them, and through them causing the disease to be carried over to other herds through public sales, and thus increasing the number. I might say that the percentage of increase in the last six years, according to government postmorten statistics, is 300 per cent, increasing in a geometrical ratio.

The point I have in mind, and have tried to bring out—is, that the farms shall be automatically located, so that when you look over the entire United States you will have the situation before you. Today the problem is on six million farms. If only ten per cent. of them have tuberculous animals, that would reduce the problem to 600,000 farms. If only one out of ten farms were involved, and we would make a survey of nine of them just for the satisfaction of knowing they did not have any trouble, it would be the tenth one that we were looking for.

In other words, then, if we carry out the work on those particular farms only, every dollar that is spent will bring results.

DR. E. A. CAHILL: Mr. President, there was one point brought out here by Dr. Kiernan and Dr. Peters, which seems to me should have a little more consideration with reference to the amount of tuberculosis in garbage-fed hogs. I think some explanation of that is due, particularly since the department of which the Bureau is a part is now about to organize a definite plan, a definite policy, to assist in making it uniform, that waste products in the form of garbage be utilized by feeding to swine. Dr. Kiernan gave, I believe, two or three examples of the amount of tuberculosis found in certain cases, certain specific cases—one in swine fed from hotel garbage in New York City, which has been carried on for years, and another, the conditions found in Denver several years ago; and the third I do not recall. Dr. Peter's stated, practically, or at least gave the inference, that it was next to impossible to feed garbage to swine without spreading tuberculosis. I do not believe that such statements will give us a true set of data or statistics on the amount of tuberculosis in garbage-fed swine. I do not believe that such a statement is any fairer, or any more correct, than for me to say that because there is a given amount of tuberculosis in the swine coming from McGregor county, Iowa, we ought not to feed grain; or that if we do feed grain, we must expect a very large proportion of tuberculosis. We know that the tuberculosis is not due to the fact that swine are fed grain in McGregor county, Iowa. We know that there is another reason. So we know that in all probability there is a reason for the conditions found in New York where the garbage was not sterilized.

I believe that if the Bureau, or any other agency, wants to give statistics on the amount of tuberculosis in garbage-fed swine, it should be a comprehensive survey, and they should not pick out a herd, or two or three herds, any more than they should select one or two counties in Iowa, or any other state, and give the results as the amount of tuberculosis found in grain-fed hogs. Had this statement been made a year ago, I do not believe it would have been of enough importance
to create any thought. Garbage was not being fed extensively at that time, except in the East. But the movement has been growing, and is growing very rapidly.

Aside from the few cities which we have in the West, like Minneapolis, St. Paul, Denver, etc., where garbage has been fed, it is now being taken up rapidly by other states, cities and communities. Therefore, in fairness to the government itself, and in fairness to the movement which is now being conducted by the government, it is only fair to have a comprehensive survey and some comprehensive statistics on whether or not garbage-fed swine are more susceptible to tuberculosis than other swine. I might, if I may just take one moment, speak of conditions in New England. I will go further and select a particular state, namely, the state of Massachusetts. It is a fact that approximately 90 per cent of the swine in Massachusetts are garbage-fed. It is a fact that in every town in Massachusetts and every city, we have what is known as an inspector of slaughtering.

In other words, every animal slaughtered for meat, regardless of the circumstances, must be inspected by an agent of the state. Those agents have their reports, which are turned into the state board of health, and they are always on file, just like any other public document. Now, it is on record in the Mass. State Department of Health, that for the year 1916, out of all the swine which were killed in that state under state inspection, 169 had tuberculosis. I cannot give you offhand the number which were killed, but it was a very large number—not large for Chicago, or other large killing centers, but large for an eastern state. The man in charge of that branch of the federal bureau in Boston has often been quoted as saying that tuberculosis in garbage-fed swine in the East in Boston and in Wooster, is practically unknown, as compared with the western hogs which come in. Of course, the real reason is that they are not following cattle. But at any rate, I do think that if such statements are going to be made, it behooves any person who makes such a statement, to make a more comprehensive survey, and not judge the entire garbage-fed swine industry by one or two isolated cases, where the trouble was probably due to some other source. I might also say that it is a matter of record that we have some ten state hospitals in the East which are either state tuberculosis sanitariums—in other words, sanitariums in which only tuberculosis cases are taken—or hospitals of another nature in which there is a tuberculosis ward. Every one of these institutions keep swine. For years they sterilized their garbage, but about eight or ten years ago it was given up, in every single instance. Since that practice has been given up—I have not the accurate figures at my command, not having expected to speak on the subject, but I know that what I am saying is very conservative—they have not in the ten institutions had ten cases, or one case per institution, in ten years.

**Dr. J. I. Gibson:** Mr. President, I want to compliment the gentleman who presented the paper on branding. It is a very good paper of its kind. Personally I have always felt more interested in the placing of a great big brand upon every animal that was known to be tuberculous. I see many objections to branding animals that are not tuberculous. We should never disfigure the finely bred animals and the show animals with a branding iron, in my judgment; and it will always remain more or less of a question when you put a "tuberculosis free" brand on an animal. I think the only positive brand that can be put on is a brand on the positive reactors, that will stay with it as long as it lives.
With reference to the question of who shall be the author of more uniform methods of procedure, I am loyal to the government, to the Bureau of Animal Industry. If they will formulate what is approved by the various states as a fair and good formula for procedure, speaking for Iowa, I can say to you that we will co-operate, and fall in line, but I believe that either the Bureau should lead in this matter, or the officials of the various states, with the Bureau, should agree upon a uniform method of procedure. There is a custom now in use that is more or less vexatious, i.e., the practice of testing cattle for shipment at origin, and again at destination. My experience in this matter teaches me that the best inspection, the most satisfactory inspection, can always be made at destination. I do not believe any man in another state, who is selling a breeding animal, and having his veterinarian test it, is quite as much interested in knowing to a certainty whether or not the animal is free from tuberculosis, as the citizen of the state which buys the animal, and his veterinarian who tests it at destination.

What we must do, if we cannot get more uniform methods of procedure, is to adopt precautionary measures at destination, for our own protection.

I was also very much interested in Mr. Tuttle's address this afternoon. It was fine, but I thought he was throwing just a little cold water there at the close on the tuberculin test. But I was glad to hear him say—and I trust that the reporter got his address correctly—that he thought that the tuberculin test was the best known means of diagnosing tuberculosis in a bovine animal, at the present time. I am inclined to think that probably the disinfectant has considerable to do with the results obtained, especially with reference to its effect upon the nostrils of the attendants. In Iowa, years ago, we had a high percentage of tuberculosis in the herds owned by the state at the various state institutions, percentage running as high as 75 per cent. At that time the state had insanitary premises and barns. These have all been brought up to date, and made sanitary, and the herds have been tested repeatedly. Buying has been done more carefully. All the animals brought in have been tested. The regular practice of cleaning and disinfecting at the state barns has been carried on, in some instances, once a month, some of the superintendents insisting upon cleaning and disinfecting their barns twice a month. As a result, the percentages since we began testing out the herds, have been reduced to one-half of one per cent, the percentage for the past year.

While these papers and the discussions have been good—the best I have listened to on the subject—yet I would dislike to have the impression go out from here that this is an impossible proposition. I believe that good, conscientious, honest, systematic work will eliminate tuberculosis from a herd of cattle—and I hope every man will go away with that belief.

We have tuberculosis in Iowa. We have little means to deal with the problem. We are ready to invite Dr. Kiernan to come over in the very near future and help us establish a few accredited herds. And I assure you, gentlemen, so far as we in Iowa are concerned, that we have no desire to establish accredited herds as a system for licensing the crime of dealing in tuberculous cattle, and handing them over to our customers. We want it made certain that the establishment of accredited herds in the various states, as well as in our own state, shall be the most sacred process yet attempted in the line of sanitation; and we must be very careful about adopting a uniform method of accrediting these
herds. If we are not careful, the accredited herd system will become the means of breaking down what interstate inspection we have, and whatever safeguard that may mean to the various states, and make it easy for an unscrupulous man to register cattle. So let us be careful.

Therefore, let us come to the meeting tonight in real earnest, and try to get something beneficial out of it. We cannot afford, with the government crying for more meat, more beef, and more pork, to allow this destruction from tuberculosis to go on. Neither can we institute measures that will cause an unnecessary reduction in the production of meat. For the present, we must weigh this procedure very carefully, and possibly during the duration of this war, it will not be expedient to institute as thorough and as careful a system of weeding out tuberculous animals as will be feasible later. The crying need of this government today is the production of more meat, more cattle, more hogs, more bacon and more hams. We must feed our army. I heard a prominent representative of the American Red Cross say that the American Red Cross had pledged to the army of France that they should no longer get letters from their wives and children saying that they were hungry, and that they were cold, and that the American Red Cross would see that they were fed, clothed and warmed, and that when their dwelling places were destroyed they would build places for them to live in. Therefore, under such circumstances, there should be just one thing uppermost in every mind, i.e., increased production. I thank you.

Dr. C. A. Cary: Mr. President, I wish to make a motion, if it is in order.

President Wills: We will have to amend the by-laws to do it, Doctor. Is it under the head of New Business?

Dr. Cary: I thought a motion was in order at any time.

President Wills: If the convention wishes to amend the by-law, Doctor, very good. We are acting under the program. This would have to come under the head of new business. However, the Chair will entertain a motion to suspend the by-laws temporarily, to consider the motion of Dr. Cary.

Dr. Cary: Then I move that the by-laws be suspended for a moment. The motion was seconded and passed.

Dr. Cary: Mr. President, I offer a motion to the effect that a committee consisting of Dr. Kiernan, Dr. Moore, Dr. Butler, Dr. Gibson, Dr. Ward and Dr. Peters be appointed to consider suggestions along the line of uniformity of accredited herds and testing methods in the different states, as stated at this meeting.

President Wills: What is your pleasure?

Dr. Cary: I move its adoption, Mr. President.

The motion was seconded and passed and referred to the Committee on Resolutions for consideration.

Adjournment was taken to Tuesday, December 4, 1917, at ten o'clock a.m.

THIRD SESSION.

Tuesday, Dec. 4, 1917.

President Wills: The first number on the program this morning is the “Report on Infectious Abortion,” by Dr. Giltner, of Michigan.

Dr. Ward Giltner: Mr. President and gentlemen: I may say the committee consisting of Dr. Potter, Dr. Flowe and myself had to work out this report without the assistance of Dr. Flowe, because he entered
the service of the Government, and is now in France, having a commission in the Veterinary Reserve Corps. Dr. Potter and I have prepared the report, and the credit for whatever is good in the report is due to Dr. Potter.

Mr. President and Gentlemen: The Committee on Contagious Abortion appointed by your president in accordance with a resolution adopted by this association at its last meeting, submits the following for your consideration:

The purpose of the resolution as the committee interprets it is, that we shall as quickly as possible settle our differences in regard to minor details, state the facts already established as clearly as may be and point out those lines of investigation which are still necessary for a clear understanding of the problem, to the end that confusion may be avoided and a basis established for a systematic and country-wide campaign against this disease. The language of the resolution directs your committee to draw up a compilation of the literature. That, in itself, is a large undertaking and in view of the wide range covered by the publications and the limited facilities and time at the disposal of the committee, we felt that the best that we could do was to prepare as detailed a bibliography as possible without comment thereon. A bibliography is, therefore, appended. We ask that omissions be called to the attention of our successors and we advise that additions be made to this list annually.

Acting upon a resolution adopted at the annual meeting of the U. S. Live Stock Sanitary Association, held at Chicago, December, 1916, the president appointed a committee which was instructed to gather information from all sources concerning abortion disease, to draw up a compilation of the established facts concerning the disease and to recommend such measures as have been found most effective in combating it. It is hoped that such a report will allay much of the uncertainty which now exists and lay a foundation for rightful measures of control.

The committee in submitting the accompanying questionnaire desires that you answer only such questions as are covered by your experience. It is apparent that the list of questions is so extensive in its scope that the experience of no one man would enable him to answer all the questions. The purposes of the committee demand that its recommendations be based on an accurate record of the experiences of those familiar with the disease, and we trust that this matter will receive your immediate and earnest attention.

(Signed.)

WARD GILTNER.

B. B. FLOWE.

REPORT ON CONTAGIOUS ABORTION DISEASE OF CATTLE.

The committee decided that we could hope to do no more than establish the ground work for future action and consequently if, through our efforts, the foundation can be laid on which future committees may build, we believe that our efforts will not have been in vain. It was decided that the first step should be to ascertain where and to what extent the disease exists, what efforts are being made to control it and the views of those having a
right to an opinion as to the methods of dissemination and the
most practical measures for combating abortion disease. A
questionnaire was, therefore, addressed to investigators, state
veterinarians, directors of experiment stations and practitioners.
Replies were received from approximately 30 states and 60
individuals. Many competent men did not reply and your com-
mittee was, therefore, denied the benefit of their experience. The
work of examining so many papers, classifying the information,
harmonizing the ideas and restating them in a report was not a
simple matter. Naturally the statements which we make will not
meet with the approval of all, but they represent the best judg-
ment of the committee. In preparing the questionnaire many
questions were asked which seem simple; but negative as well as
positive evidence was desired. In judging of the relative impor-
tance of the answer, more weight was given in the technical mat-
ters to the replies of men who have had wide experience and
ample opportunity for investigation, and due weight was given
to the replies of practitioners and professors of animal husband-
ry concerning the prevalence of the disease, and the interest be-
ing taken in its suppression, while the replies of men in the west-
ern states were given preference in questions involving range
abortion.

History and Distribution. When did abortion disease first appear in
your section? How widespread is the disease in your state? (a) In
dairy cattle; (b) in beef cattle.

Infectious abortion was observed in this country in Michigan
as early as 1857, and in epizootic form in central New York in
1867, in Pennsylvania in 1891 and in Ohio in 1895. It occurred
in the Middle West as long ago as 1897, in the Southwest as far
back as 1910, in the far West as early as 1896 but has appeared
mostly since 1902 and in the South since 1903.

The disease is widespread in dairy cattle in the East, es-
pecially in large herds; there are few beef cattle in the East. It
appears to be on the increase. It is very common in the Middle
West and Southwest, from 20 to 50 per cent being reported in-
fected among dairy cattle and a smaller percentage among beef
cattle. The far West reports the disease common in dairy cat-
tle and increasing in beef cattle. The South reports the disease
in importations and especially in dairy herds near cities but not
common in range cattle.

Cause. What do you believe to be the causes of abortion in cattle?
(a) Specific; (b) Accidental. What do you consider predisposing fac-
tors? What is the relative susceptibility of types or breeds of cattle?

As indicative of the opinions of those replying to the
questionnaire as to the cause of bovine abortion 29 incriminate the
Bang bacillus, 24 merely affirm infection, 28 state belief in accidental causation though only as a minor factor and eight condemn feeds and feeding.

Many believe there are no particular predisposing factors, others confess ignorance of such possible factors. Some believe constant exposure to the Bang bacillus, to be the only factor, others believe a particularly virulent strain of the germ necessary for infection. Some would incriminate other germs, pus producers. Unclean genital organs are suggested as a cause.

Pregnancy is pointed out as an essential factor, as well as natural susceptibility and faulty sex development. Under diet we have such suggestions as unbalanced, monotonous diet, starvation, roughing it on pasture or in barn when dry, high protein diet, purgatives, constipation or laxative diet, or malnutrition from any cause. Then there are suggested such causes as modern methods of intensive dairying, confinement in dairy stable, heavy milking, crowding or close confinement, or any factor that lowers vitality, as toxins of other infections, any enfeebling influence, exposure, bad sanitation, lack of exercise or injuries, shipping, fright, genital neoplasms, filthy genitals. There is of course some confusion in differentiating predisposing factors and factors responsible for spreading the infection.

It is almost the consensus of opinion that there is no special breed susceptibility, thirty replies being to the effect that all breeds had been observed equally susceptible or that no particular breed had shown special susceptibility. Quite a number believe that dairy breeds are most susceptible. Isolated opinion or observation is to the effect that Jerseys, Guernseys or Holsteins are most affected and Ayrshires least, or that pure-bred cattle are most susceptible and range cattle least, or that the disease is wide-spread in range cattle or that specialized functioning increases susceptibility or that heifers are most susceptible.

Dissemination. How do you believe abortion to be spread? 1. Agents, (a) Bull; (b) Cow; (c) Calf; (d) Stable; (e) Pasture. 2. Avenues: (a) Ingestion; (b) Copulation; (c) Udder. 3. Time: (a) Fetus; (b) Calf; (c) Adult. 4. Methods: (a) Sale and purchase of affected animals.

It is accepted by all that the cow is the chief agent in the spread of the abortion germ. Every reply, 62 in number, incriminated the cow. Over half the replies, 37, are to the effect that the bull is a factor of importance, while many consider the bull a negligible or unimportant factor. About one-third of the replies are to the effect that the calf is involved in the spread of the disease. Many confess ignorance of the part played by the calf or question its importance. Nearly every one believes the stable to be a factor in spreading the disease but its importance de-
pends upon the care that is taken of the affected cow. There is far less reason to believe that the pasture is involved in the spread of the disease.

The avenue of infection is probably by the mouth, by copulation or by the udder, although the germs may enter the genitals via the vulva otherwise than by copulation. The replies would indicate that copulation is the most important route, although there is the exceptional opinion that copulation is not a factor at all or not one of importance. A large majority are inclined to the view that ingestion is an important source, a considerable number being very emphatic on this point. While a few deny the possibility or probability of this source. About the same may be said for the udder as for ingestion.

The time that infection takes place may be considered under the three periods in the age of the animal, viz., the fetus, the calf and the adult. There is practically unanimity of opinion that the adult is the age of infection. Over two-thirds of the answers indicate a belief that the fetus becomes infected and a lesser number believe the calf is the age of infection, but these replies do not indicate whether infection of the fetus or calf is prolonged to the time of conception with the result that abortion is produced.

It is believed that the chief method of spread of the disease is the sale and purchase of infected animals.

Attention is also called to the danger of taking cows for breeding to outside bulls or bringing such bulls into the herd for occasional service; also to the possibility of adding fuel to the fire by bringing in susceptible cattle or stirring up the fire by introducing a more virulent form of the disease. The possibility of introducing the disease by means of milk and its products is not to be overlooked.

Persistence. How long does the organism of abortion persist in:

1. Adult: (a) Uterus; (b) Udder; (c) Male Genitals; (d) Elsewhere.
2. Calf: (a) Digestive Tube; (b) Elsewhere.
3. Stable, pasture, dairy products, etc.

The persistency of the infection in the various organs of the body of the adult is a question that about two-thirds of those questioned did not undertake to answer. Twice as many believe the infection in the uterus to be of short duration as the contrary. Nearly every answer was to the effect that the organism persisted in the udder for years or indefinitely. With one or two exceptions the opinion prevails that the infection of the male genitals is temporary. Opinions and evidence relating to the persistence of the organism elsewhere within or outside the body do not seem to be numerous or weighty.

The very few who were bold enough to venture an answer
believed that the abortion germ persisted in the digestive tube or elsewhere in the calf only a short time after birth and that it might be revived temporarily by the ingestion of infected milk.

No one seems inclined to a positive view regarding the persistence of the organism in stables, pasture and dairy products. Only a few answers were given and these were of a general nature.

What organs do you consider are involved and how? (a) Ovaries; (b) Uterus; (c) Vagina; (d) Udder; (e) Others.

No one disputes the fact that the uterus is the constant and most important seat of infection, although some consider the grosser manifestations of metritis due to secondary infection. The vagina is looked upon as being involved superficially or only incidentally and passively, except that the so-called and unexplained granular vaginitis is frequently associated with abortion disease. Involvement of the ovaries is almost universally admitted, but explained by none, a few reporting inability to demonstrate the presence of the Bang bacillus in infected ovaries. As a rule the udder is looked upon as usually harboring the germ as a harmless parasite (probably incorrectly reported as saprophytic) but serving as a potentially dangerous carrier or perhaps as superficially inflamed; one report expressed the opinion that acute mammitis might be produced. Concerning the involvement of other organs we have isolated suggestions covering vulva, male genitals, lymph nodes adjacent to udder, digestive tube, liver, fallopian tubes and most striking of all the opinion that abortion disease is a blood infection with other organs only secondarily involved.

Give your opinion of and summary of experience with following methods and diagnosis: Serologic: (a) Agglutination; (b) Complement Fixation; (c) Others. Allergic: (a) Abortion—temperature; (b) Intradermal. Physical: (a) Individual Animals; (b) Herd; (c) History.

The diagnosis of infectious abortion by serum tests is a matter of dispute. The disputed point, however, is in connection with what the reaction means, i.e., with the interpretation of the results. Assuming that a reaction means involvement, present or past, of the Bang bacillus, it is the opinion of many that the agglutination test is accurate in 80 per cent or more of cases. It is the general opinion that the two common serum tests, agglutination and complement fixation, are about equally reliable, a few believing one or the other the more reliable. Almost every statement in favor of one is counteracted by a similar statement in favor of the other except that the complement-fixation test is looked upon by many as requiring too careful technic for universal use.
Some consider these tests not practical, applicable only in locating the disease in the herd, inconclusive and not absolutely reliable. Other serologic tests are not mentioned but the isolation of Bang's bacillus from milk, discharges or fetus culturally or by guinea-pig inoculation is suggested.

The allergic tests are not considered reliable.

The importance of physical diagnosis is not equally emphasized. So far as the individual cow is concerned opinions range from the acceptance of its complete reliability to complete unreliability. Sometimes it appears possible, sometimes not. The appearance of the primary and secondary genitals before the act may or may not assist. The appearance of the membranes, discharges, and fetus after the act may or may not decide the matter. Generally the observance or proof of the act itself is considered essential and not always possible. Other causes than infection should be given due consideration. An examination of the herd is considered more important. The absence of many calves, granular vaginitis, abnormalities in heat period, signs of vaginal discharges are to be observed. The history of the cow, or of the herd, more particularly, is a reliable means of diagnosis only if the history itself is reliable.

Attendant conditions. What is the relation between abortion and the following conditions? (a) Sterility; (b) Retained afterbirth; (c) White scours; (d) calf pneumonia; (e) udder trouble; (f) granular vaginitis.

It is generally admitted that abortion disease of cattle is quite unfortunately named, the act of abortion constituting only one of the manifestations of the disease and is itself not a constant manifestation. Nearly sixty replies were received on this point and without exception they associate sterility with infectious abortion, either as a sequel or complication of the infection not necessarily caused by the same germ and either quite constantly or, in fewer instances, rarely associated with the disease.

It is pointed out by a few only that sterility or failure to breed is not necessarily dependent on or associated with infectious abortion. The same statements apply only in a very slightly less degree to retained afterbirth. There is very little tendency noted among the replies to associate infectious abortion with white scours, calf pneumonia or udder trouble except incidentally or as a predisposing factor, and these conditions do not by any means appear to be constantly observed by those having experience with abortion itself. Attention is frequently called to the fact that Bang's bacillus is rather constantly found in udders in aborting herds but not in the rôle of a pathogen. About an equal number believe that abortion and granular vaginitis are not related or are related or that their relationship is incidental only.
Immunity. Is there a natural immunity? Is there an acquired immunity? (a) From naturally acquired disease; (b) Artificially produced. What is the duration of immunity? Give your ideas concerning the following methods of prevention, treatment and control:

About one-third failed to venture an answer to the question concerning natural immunity. Most of those answering believe that there is a natural immunity in some individuals, relative in degree, of course, as is all immunity. There is a tendency to fail to differentiate between natural and acquired immunity. The latter may be acquired naturally or artificially. Out of fifty replies, all but two admit that there is at least a slight evidence of immunity acquired naturally. A lesser number, 37, undertake to pass judgment on artificial immunity, of these only 14 accept the proposition outright, the remainder denying it or questioning its possibility or practicality, a few stating that it is hopeful but as yet in the experimental stage. Only 27 attempted to indicate the duration of immunity. Of these, 14 state it is permanent or for life, three say for years, seven say variable, long or transitory, and three short.

Prevention and treatment. 1. Sanitation as applied to buildings, etc. 2. Douching of animals. 3. Herd management: (a) Feeds and feeding; (b) Isolation of parturient animals; (c) Isolation of aborting animals; (d) Rearing of Calves. 4. Use of vaccines: Live cultures; killed cultures. 5. Use of drugs: (a) Carbolic acid; (b) Methylene blue; (c) Proprietary. 6. Sale or slaughter of: (a) Aborting cows; (b) Reacting cows; (c) Bulls.

Of 55 opinions expressed as to the value of sanitation as applied to buildings we report the following shades of opinion in order of emphasis placed thereon: Acquiescent, important, necessary, essential, good, useful, of little value, very helpful, advisable, beneficial, desirable, very effective, undetermined, may help, constant, first. About 60 per cent of the correspondents express emphatic belief in douching of animals, i.e., those that abort, and if properly done; a few are lukewarm on the matter; a number condemn it; one says it will have no effect on Bang's disease itself.

Replies were received from nearly all the questionnaires on herd management. The importance of feeds and feeding is not emphasized except that feeds should be uncontaminated. A few call attention to the desirability of restricting protein diet, advisability of good feeding or careful feeding. A large majority think that isolation of parturient animals is important or desirable. A few think it unimportant, of questionable value or impractical. With very few exceptions isolation of aborting animals is recommended at least on sanitary grounds. A few think the matter of no importance. In the handling of calves nearly one-third advise using pasteurized, boiled or clean milk; a few
recommend isolation and cleanliness, raising of calves to replenish herd, protection of herd from infected calves and the necessity of more study.

Only about one-third made any reply to the question concerning vaccines. Most of these replies were indefinite. So far as live cultures are concerned six stated that they are the only satisfactory method, valuable, promising or probably useful, and three said "a thousand times no," "do not believe in their use" "not advisable," while five hesitated to make any recommendation. A larger number probably had had experience with killed cultures. Eight referred to them as having some virtue, valuable more or less, of proved value or that they should be in careful hands or that the writer thinks he got good results or that they cause appearance of agglutinins and amboceptor in treated animals; eleven characterize them as of questionable value, doubtful, useless, no good, unknown, indefinite or possibly of value.

About 60 per cent of those reporting state that carbolic acid (internally) is valueless, describing the practice as "Tommy rot," worthless, useless, not efficient, not successful, not specific, or not of proven value; less than one-third defend its use as worthwhile, helpful, good if persisted in, good reports for preventive purposes, lowers number of abortions while being used, apparently effective, of some value, thought helpful, gives owner something to do, or farmers believe in it. Only six replies defend the use of methylene blue as most promising, gives good results, often succeeds if persisted in, apparently successful, being less valuable than carbolic acid, or having little value; nearly all the answers are to the effect that it is "Tommy rot," a joke, no good, worthless, negative, useless, not specific, of no value, not germicidal, produces no results, or writer does not like it. No one has a good word for proprietary preparations, they being designated fakes, useless or worse than useless. Suggestions for the use of formaldehyde and potassium iodid are made.

Relative to the sale of aborting cows, reacting cows and bulls the following seems to represent the opinions expressed: Aborting cows should be sold for slaughter only; they should be sold only if of little value and when permanently sterile or unprofitable; the sale of aborting, but otherwise valuable, cows does not help to control abortion in the herd and should be discouraged. On the basis of reaction alone cows should not be sold. If bulls are sold they should be slaughtered; otherwise opinion is divided to the effect that they should be sold if only reacting or only if sterile or that they should be kept.

Is the abortion situation in the research, extension (educational) or regulatory stage?

What should be the official attitude toward the disease?
Should abortion be classed as an infectious disease within the meaning of the law?
Give your suggestions for a practical method of control.
Is the "State accredited herd plan" feasible?
Are we ready for uniform measures of treatment and control?

Nearly everyone admits that infectious abortion is in the research stage, about half of the answers indicate that some educational or extension work might well be done, and only a very few venture to advise that a careful attempt be made in the direction of regulatory measures. Every shade of opinion is expressed relative to the proper official attitude toward the disease. The same is true in regard to classing the disease as infectious within the meaning of the law. The majority, while admitting that it is an infectious disease, would hesitate to treat it as such by regulatory measures until more accurate knowledge is available. A few detailed replies offering many apparently logical suggestions as to practical methods of control were received, but on the whole the answers show a very serious lack of agreement on any rational method of procedure such as all can agree upon in the control of many other diseases. The state accredited herd plan does not seem feasible for the present. With the rarest exceptions no one believes that we are as yet ready for uniform measures of treatment and control. Several gratuitously note that uniformity is not possible with any disease.

Can it be definitely proved whether a herd is free from infection?

Nearly every answer is to the effect that it cannot be definitely proved whether a herd is free from the infection, a few stating that the proper use of serum tests can be relied upon to determine this point and a few making their affirmative answer contingent upon the reliability of the serum tests, which is only begging the question.

What suggestions can you offer concerning the control of abortion under range conditions? 1. Breeding. 2. Buying and selling. 3. Raising calves. 4. Vaccination. 5. Effect of introduction of dairy cattle.

Infectious abortion under range conditions seems to be a great problem. Only those having to deal with such conditions are qualified to pass on the matter. Generally it is advised that great care be taken in the introduction of the herd bull, and of cows newly purchased. One man recommends putting the herd bull with the herd on range not earlier than July first in the north. Keep dairy animals of breeding age off the range and do not breed known infected stock. There is little tendency to advise flushing. One interesting suggestion is that centers of infection should be located by serum tests made at the abattoirs where blood samples could be collected from range cattle. Although it is generally advised that buying be done with caution,
some even advising serum tests, and that sales be made of known infected animals for slaughter, yet there are some dissenting voices concerning the practicability of these measures. About the only acceptable suggestions relative to raising calves under range conditions are that they be kept away from old corrals and winter feeding grounds and away from infected cows or milk from such cows. Vaccination is looked upon by some as only hopeful. Dairy cattle and bulls should be kept off the range or at least prove their freedom from infection first.

Is your state engaged in research under the Adam fund or other appropriation?

What do you consider the most practical method of gaining fundamental information (suggestions for research)?

Do you consider lay reports of any value?

As near as we can determine not more than one-third of the states are doing any research on infectious abortion. About one-fourth of these are working under state appropriations, others use federal funds. The most practical methods of gaining knowledge concerning the disease seem to be to undertake laboratory research supported by federal or state funds, to come in contact with actually infected herds, to employ competent field men, to exercise state control over a few infected herds, to study varieties and distribution in nature of causal organism, to experiment on modes of spread and immunity and to co-operate with practicing veterinarians. Many have no confidence in lay reports concerning the disease. Only laymen properly trained seem to be able to do more than indicate the probable presence of the disease.

Is widespread publicity among stockmen desirable?

What suggestions have you for an educational campaign?

It is almost the unanimous opinion that stockmen should be made acquainted with the facts concerning the disease, but there is a feeling that they should not be burdened with theories and a few are of the opinion that there is nothing yet to give them except what will unnecessarily frighten them and "make them cautious in buying." Stockmen should be approached through the press, bulletins, farmers' institute, extension departments, district veterinarians, by individual visits and through local specially-educated veterinarians. The suggestion is given that a small advertisement be carried in farm papers advising against the sale of exposed or affected cattle and against introduction of fresh animals; also the use of moving pictures is proposed.

To what extent is the abortion problem being discussed in meetings of farmers, breeders and veterinarians?

In general we would say that infectious abortion is widely discussed in meetings of farmers, breeders and veterinarians. In
short it is a "live topic" or the "question of the day." There is an impression that it is talked more among veterinarians and that some stockmen are a little shy about discussing the subject freely and frankly and one man points to the delicacy of discussing the subject in the presence of ladies.

Who should assume the initiative in matters of education and control?

Who should assume the initiative in matters of education and control? No one seems to know since every conceivable suggestion, promoted probably by local conditions, is offered. Perhaps therein lies the answer—let him take charge who will and can!

What suggestions can you offer concerning co-operative effort between federal and various state agencies: (a) Division of labor; (b) Coordination of effort.

Many suggestions were offered concerning co-operative efforts between federal and various state agencies but it is beyond the power of your committee to crystallize any composite suggestion from the answers received.

It is quite clear to your committee that prolonged extensive investigation must be carried on. So many vital problems remain unsolved and the field is so large that scientists may employ their best talent for many years to come. Many are already at work but each in his own way without regard to the efforts of others and while much is being discovered, there is great waste in time, material and energy, through duplication, uncompleted experiments, inadequate equipment, etc. Certain problems, such as range abortion, which cry aloud for solution, remain untouched because of lack of consideration or lack of funds.

There are many problems peculiar to certain sections and some stations, because of equipment and personnel, are especially fitted to investigate certain phases of the problem. Effort should not be wasted through taking up work which might be done better in another section or by some better equipped laboratory. The results of the various investigations could be correlated and a yearly report of progress could be rendered to the advantage of all.

WARD GILTNFR,
B. B. FLOWE,
GEO. M. POTTER
Committee.

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DISCUSSION OF CONTAGIOUS ABORTION IN CATTLE.

President Wills: Neither of the two gentlemen who were to discuss this report are present. Dr. Potter of the committee has requested an opportunity to discuss the matter, and I will call upon him to open the discussion.

Dr. Potter: Mr. Chairman and gentlemen, while I helped to prepare the questionnaire and have given it considerable study, and agree in all the essentials with the report as rendered there are a few things that I wish to say in regard to it.

When I introduced the resolution last year for the formation of this committee, I had certain definite things in mind. I had had considerable experience in government service through correspondence, and various trips throughout the country, and I had come to the conclusion that this disease was not understood as it should be throughout the country. Many men are not awake to the situation. They frequently tell me that it was not a matter of great importance, or worthy of particular study. I have in my possession information which definitely counteracts that opinion.

In other instances I found that the men were so impressed with the seriousness of the situation, and it was such a large problem that they were ready to throw up their hands and surrender.

I believe that both of these situations could be overcome if the investigations were undertaken in a proper manner. This disease is a very veritable "Hun" in the way it works, it is so quiet and insidious in its start, but none the less rapid and complete. It has spread everywhere throughout the country, and unless we awake to the situation and undertake some effective means of control, we are going to arrive at a condition some day which will be beyond us.

If there is one thing above another that I sought to accomplish in introducing that resolution, it was to shock, if I may use that word, these men into a realization of the importance of this proposition, so that the officials who are now attempting to deceive themselves by thrusting it into the background and trying to conceal the proposition would realize that they must meet it squarely.
In the replies to the questionnaire, there were many who said: "We have sufficient knowledge to make a beginning." Let us make that beginning now. Let us not wait until we have some effective cure for the proposition. That may take many years, let us make a beginning. By teaching the farmers the facts as we know them at the present time, we can keep them from doing many foolish things which will tend to keep the disease going. I believe that in many cases we have not accomplished what we might because we have not tried, and I would have everyone who has anything to do with this officially, do what they can to start this work.

I believe that many of our experiments have been inadequate both in the numbers of animals employed, and in the time that has been devoted to it. Many of the experiments have not been adequately checked. It has been assumed from the conditions found in the field that a certain thing is true. For instance, in an outbreak of the disease a certain remedy is employed and the disease subsides; hence it is concluded that the remedy has checked the condition, but perhaps these experiments have not been checked up sufficiently.

Many of the experiments under the present system have been incomplete, that is, full advantage has not been taken of the facts that have been discovered. There are many duplications, there are many phases which have not been touched at all.

That brings me to this point. I believe that we should establish some central organization which has a countrywide view of this proposition, so that they can assign or arrange certain topics for investigation. As we state in our report, many phases of this disease are sectional. For instance, we cannot investigate adequately range abortions at the laboratory in Washington. We must do it in the field where the work is being done; and so if we have a great central organization which can arrange these various topics, assigning each one where it belongs, we will progress faster.

This central organization can co-operate or correlate the results of the investigation, and report each year on the progress which has been made. That will eliminate much of the unnecessary duplication, and the organization will at the same time be in a position to take full advantage of all the facts discovered. If one laboratory discovers a certain line of work, it may not be in a position to follow the many side lines which develop from it, but they can be assigned to other laboratories which are in a position to attend to them, and in that way we will conserve effort.

I am not particularly interested as to which organization assumes this responsibility. I would suggest that the Bureau of Animal Industry is in perhaps the best position to undertake this work. I know there is some little jealousy among the various stations in regard to the Bureau along these lines of investigation. I may be rather bold in making some of these statements, but I am going ahead, anyway. I believe that it can be arranged in such a manner that each person can get adequate credit for all of the work which he has done. Also that the initiative of each station will not be interfered with if the work is handled properly, and when we have done that, we have done away with perhaps any objection which might be raised on that score.

There is one other matter. Yesterday we heard a great deal about the eradication of tuberculosis and the accredited herd plan. I believe that this plan offers an excellent opportunity for combating abortion. At the same time most of our tuberculin tests, that is, subcutaneous at any rate, require that the operator be present for at least twenty-four hours. That
give him an excellent opportunity to consult with the owner in regard to tuberculosis and abortion as well. The two diseases are coexistent in many cases, and I believe that the man who is testing for tuberculosis should be instructed fully in matters pertaining to contagious abortion, and thus an excellent opportunity will be afforded for combating the two diseases simultaneously. I thank you.

President Wills: The subject is open for general discussion, gentlemen. I know there are many here who would like to talk on contagious abortion, and now is your opportunity.

Dr. Haslam: Mr. President, I would like to ask to have repeated and contrasted some of the figures with regard to protective measures, without going over all of them. There are still as many believers in the old carbolic acid treatment as there are in bacterin, although I take it it was put the other way around. There were probably less knockers on the bacterin, but taking the total number opposing each I got the impression they would be about equal. I would like to know what the figures really show.

Dr. Giltner: I don't recall the figures. I think numerically your figures might be correct, but the number of people having experience with bacterin is rather limited, and I think the figures there show that while there are still some people who believe in carbolic acid, the vast majority do not, and if the vast majority do not believe in bacterins, I would take it to be a fact either that they are "no good," or that the people have not had experience with them. Does that answer your question?

Dr. Haslam: How many replies were there in regard to the bacterin?

Dr. Giltner: A limited number, less than thirty, I believe.

Dr. Haslam: There were fewer replies in regard to the bacterin than there were in regard to the phenol?

Dr. Giltner: Yes, sir.

Dr. Haslam: How many negative replies on bacterin?

Dr. Giltner: I do not recall just exactly what the figures were. I think most of the replies conveyed the idea that they had not gone far enough yet to be able to speak decisively.

President Wills: Has anyone anything further to offer on this subject?

Mr. Glover: Mr. President, I would like to hear a few simple rules laid down for treating abortion on the farm. I have been here for a number of years listening to discussions on contagious abortions, and I have never yet heard any concise recommendation of the general body as to how abortion should be treated in the herds on the farm, and it seems to me this body of men ought to be able to give and take enough to outline the general treatment of contagious abortion. Last year there were three different methods, three different opinions given, and it seems to me that we have not gone far enough, or we would have something developed from this organization.

Dr. Giltner: Mr. President, I would like to say in reply to the gentlemen, whom I believe is an agricultural editor?

Mr. Glover: Yes, sir.

Dr. Giltner: As chairman of this committee you could not sting me on any such proposition as that. There has been a great deal written on the subject of contagious abortion, some of it has my name connected with it, but as connected with this committee, I did not take it that that was our function. Our successors, I hope, will be able to do what you ask. It is a very important thing, but we did not undertake any such thing, because we did not think that we were qualified to give any such suggestions. I had that opinion before I wrote the report, and I was
more convinced of that opinion after I wrote the report, because of the divergent views expressed by wiser people than myself on this subject. I think that the publication by Eichhorn and Potter contains as many practical suggestions as we could ask for at this time. That bulletin is available for everyone.

Dr. Ferguson: Mr. President, I would like to say a few words on handling this disease from a practitioner's standpoint. I have had considerable to do with trying to control contagious abortion. I have had a little experience with the bacterin treatment and considerable experience with the carbolic acid and other treatments that have been recommended. I have found from experience, from my own practice, that phenol or methylene blue have no beneficial effect on controlling abortion. I would consider a bacterin that would take care of 60 per cent of the cases, good. I never have found one that would do that, so I have not very much faith in bacterin.

The way that I have handled contagious abortion, or tried to control it in pure bred herds for the last few years, has been to treat the whole herd, that is, examine all cows that were discharging, get their history, and if sterile, try to find out what the cause of the sterility was. In a great many cases, it was due to metritis. It is astonishing how many cows have bad discharges in the herds that are affected with abortion.

If we confine our treatment to the cows that have recently aborted, we do not get anywhere towards its control, but we should treat the whole herd—and I would like to state as my opinion that it is the veterinarian's function to take care of that, for I have not had very good results in prescribing treatment and allowing the farmer to carry it out. He will not use care enough, he does not understand the technique. He may be intelligent and willing, but he has not had the experience, and it takes too long to educate him to do it, and I find in a good many cases that they are very careless. I would rather not undertake the cases, than to turn the treatment over to a farmer or to a herdsman.

I am treating a herd now, in fact I have a herd under supervision, that has one of the best herdsmen that I ever saw. His name is Fred Ashbury, probably a good many of you may know him. He used to be with Colonel French's herd in Iowa.

A little over a year ago 50 per cent of that herd was sterile. When Ashbury took charge of the herd, they were in poor condition; that is, they were in good condition physically, but they were in bad condition so far as regards sterility, and having bad discharges. There had been a number of abortions and calf scours, and the herd was considered in very bad shape. It was a herd that had been collected from different sources. There had been considerable tuberculosis, but it had been fairly well cleaned up from that, but it was showing the effects of severe abortion.

We took the herd in hand and treated all animals where treatment was indicated. About 15 per cent of the herd were sent to the block, including some of the best show cows.

We treated one cow, that was bought of Colonel French when she was a heifer, considered not very good, or he probably would not have passed her on, for about three months, finally she conceived, and she has just made a record for the state of Wisconsin. She now has the record for a junior four-year old, of 30.3 in seven days.

We have a complete history of the other cows, so that it is not guess-work; we know just what condition they were in, we have a record and a diagnosis that we made the first time, and we have kept track of them and know just how long it took to clean them up.
In that herd there are some 40 milk cows now, including first calf heifers. So far we have had 15 heifer calves and 2 bull calves. The calves are all healthy with one exception. We have had trouble with two cows, one cow gave birth to a pair of twin heifers. She came in about nine days ahead of time and retained her placenta, suffered from metritis, and we had to do considerable work to get her cleaned up. We did not attempt to remove the placenta, because that was a physical impossibility. We kept the os open and treated the uterus, and finally succeeded in removing the placenta, and carried her through her metritis. She got pretty thin and run down, but she is coming on nicely now, and has no discharge.

The other was a first calf heifer that delivered a bull calf about a week ahead of time. She suffered from retention of the placenta, was treated in the same way as the other one, and is doing first rate. We will keep after these two cases until we are absolutely sure that they are clean, and until we are satisfied that they have recovered from their metritis. We will breed them just as soon as they are in heat, and if they do not conceive, we will keep after them until we find out the cause. We will diagnose the case, examine them, and find out why they have not bred, until we have succeeded with them. I think with pure-bred herds especially, if the veterinarian in charge will take every one of these cattle as they come in or any cow with a discharge, and clean them up, there will be good progress made in controlling abortion. I do not think in the light of our present knowledge that there is any cure for it, but if you can control it as well as we have been able to do in some herds, I think the results will be very satisfactory.

PRESIDENT WILLS: Is there any further discussion?

DR. ELIAISON: Mr. President, I have heard a great many discussions on this particular disease, but we seem to have taken no particular action in getting concerted effort to combat it. It seems we have the organization to do the work, but we all know that such work cannot be done without proper funds. The Bureau of Animal Industry no doubt has the equipment, and in cooperation with the Department of Agriculture, it seems to me an organization might be perfected, if sufficient funds were provided to put it through. Therefore, I hope the Resolutions Committee will bring in a resolution strong enough to urge Congress to set aside a sufficient amount of money to make this a real project. A project of each individual state setting aside a few thousand dollars, in some instances four or five thousand, for research work along this line, is ridiculous. Why not start it right at the center, and have all the experiments controlled from a central point?

PRESIDENT WILLS: The report of the Committee on Contagious Abortion is before you. What is your pleasure, gentleman?

A motion that the report be accepted was made and seconded.

DR. GIBSON: Mr. President, I want to say a word, not about the disease, but about this committee. I do not think I ever heard a more conscientious report from any committee than from Dr. Giltner's committee. They are dealing with a subject upon which all concede they know but little, and I consider this a masterly report, a splendid foundation upon which to build, and I really think Dr. Giltner and his colleagues on this committee are entitled to our sincere thanks for the way they have started this report, and handed it on for future definite action. I think that it took more real ability to make the report we have heard here this morning, than it would to report on almost anything else I can think of.

The motion to accept the report of the Committee prevailed.
PRESIDENT WILLS: The next paper is one by Dr. W. L. Boyd, of Minnesota, on "Necrobacillosis."

NECROBACILLOSION.

By W. L. Boyd, University of Minnesota.

Necrobacillosis is a name given to a large variety of diseased conditions caused by the bacillus necrophorus. It is characterized by inflammation, progressive tissue destruction and necrosis. It may occur in any organ or tissue of the body and practically all species of animals are susceptible to it. The necrotic areas of the internal organs, especially the liver and spleen, are usually quite sharply circumscribed and remain firm.

Historical review. The bacillus necrophorus was first observed by Koch. It was isolated and described by Loffler in 1884, as the causative factor of necrotic stomatitis of calves. Bang and Schutz were the first, however, to recognize the marked activities of this organism in the production of inflammation and coagulation necrosis. McFadyean, Kitt, Jensen, Johne, and Mohler, working with this organism have demonstrated its presence in numerous cases—necrotic lesions occurring in both domesticated and wild animals. In 1905 Mohler and Morse reported on their investigations of necrotic stomatitis, as occurring in calves and young pigs. In 1910 Mohler and Melvin described an extensive outbreak of necrobacillosis among western sheep. This condition was popularly termed "lip-and-leg-ulceration." The above named conditions, together with foot rot in cattle and sheep, quittor in horses, necrotic dermatitis and enteritis of swine, etc., have been grouped under the general heading of "Necrobacillosis."

Distribution. The diseased conditions caused by the bacillus necrophorus are quite widely distributed in both Europe and America. It is thought that the organism inhabits the digestive tube of normal swine and possibly other animals. According to a report by the Bureau of Animal Industry, necrobacillosis has existed in the United States, a great many years.

Economic Importance. Owing to the wide range of pathogenicity possessed by the bacillus necrophorus, the lesions or diseases produced by it are of considerable importance. Glover, of Colorado, reported that during the year of 1912, the losses among swine from this disease, were greater than the losses from hog cholera. In Minnesota during the past two years, necrobacillosis in various forms has been quite prevalent among swine, and in some sections the losses have been heavy.

Morphological and Biological Characteristics. The bacillus necrophorus is polymorphos, but at a rule, occurs in long threads.
in culture media and in the invaded tissues. In old cultures, bacillary forms of various lengths are observed, some being so short that they have a coccus like appearance. It is non-motile, and does not form spores. It is an absolute anaerobe, and grows in serum agar, milk and bouillon. Isolation and cultivation are not easy. The rather characteristic odor noticed in certain lesions is also noticed in culture media. It stains readily with the ordinary analine dyes, especially methylene blue and carbol-fuchsin, but not with Gram's stain. Due to their high susceptibility, rabbits are used in securing pure cultures of this organism. On account of frequent contamination, it may be necessary to inoculate a second or even a third rabbit. The inoculations are made subcutaneously with material secured from the edge or border of the necrotic area.

Morbid Anatomy. The lesion consists of coagulation necrosis, followed by caseation. The local lesions may become enlarged, due to the tendency of the organism to invade the surrounding tissue. It has been stated that the infection may occur in various parts of the body, through metastases. The local lesions have been described as rather sharply circumscribed yellowish or brownish areas, or patches, hemogenous, dry, and friable tissue. The bacillus necrophorus produces disease by the production of poisonous metabolic substances, which are liberated as soon as the organism gains entrance to the animal body, and begins to multiply. Microscopical examination of sections of these patches reveal more or less tissue debris surrounded by leucocytes in an exudate, rich in fibrin, together with numerous bacilli. The contiguous tissue is markedly hyperemic. Petechial hemorrhages of the kidneys resembling those of cholera are not uncommon.

Necrobacillosis of swine which we are most familiar with, assumes many different forms, the most common of which are necrotic stomatitis or (infectious sore mouth of pigs), enteritis, rhinitis, or (bull nose) pneumonia, occasionally hepatitis, vaginitis, and dermatitis. In one or two instances, we have observed involvement of the eye. Necrotic stomatitis is the most common form we have met with and is observed chiefly in suckling pigs.

This condition is manifested by severe inflammation of the lips and gums. Later, caseonecrotic areas develop which usually slough, producing a more or less eroded surface. There is progressive tissue destruction and the areas become confluent, forming large ulcerous-like patches. The affected pig experiences considerable pain, when attempting to nurse, the tongue is swollen, salivation may be profuse, and is at times streaked with blood. The course of this type of necrobacillosis in the acute form may terminate within ten days. In the chronic form, it may last for several weeks.
Necrotic enteritis is of frequent occurrence in swine. It may result as a sequel to necrotic stomatitis, the infection being swallowed. It may also occur directly from intestinal inoculation. *(Trichocephalus cervaus).* Necrotic enteritis often coexists with hog cholera.

The pathological changes occurring in this form of disease, involve, most often, the intestinal mucosa in the region of the ileocecal valve, although the entire length of the small intestines may become involved. The caseonecrotic material coagulates and remains intact. The underlying tissue is hyperemic, and, at times, studded with punctiform hemorrhages. The symptoms consist chiefly of inappetence, diarrhea in the early stages, unthriftiness, emaciation, and weakness. Animals showing such symptoms emaciate rapidly and die within a short time. In the chronic form, the affected pig will live several weeks, dying after extreme emaciation and unthriftiness have taken place. This form of infection, notwithstanding the fact that it is usually confined to pigs and shotes, may be confused with cholera. We are of the opinion that in numerous outbreaks of this disease antihog cholera serum has been used through error in diagnosis.

Necrotic rhinitis, commonly known as "sniffles" or "bull nose" is frequently observed in small pigs. Necrotic pneumonia is often associated with necrotic rhinitis, the infection probably resulting through inhalation of necrosed particles from the nostrils. The same general caseonecrotic lesions that characterize necrobacillosis, occur also in the lung form. In addition we have observed that pericarditis and pleuritis with more or less adhesions are of frequent occurrence.

Necrotic dermatitis is sometimes observed among young pigs, the bacillus necrophorus probably gaining entrance into the skin, through abrasions produced by trauma.

The lesions in superficial necrobacillosis consist of rather large necrotic areas, which slough, resulting in irregular denuded surfaces. In cases wherein the lesions become extensive, fatalities may be high, due to systemic disturbances, occasioned by absorption of poisonous products. The majority of the outbreaks investigated were among unvaccinated swine. We have also found it affecting young pigs from immune sows.

Treatment. The medicinal treatment of the various forms of necrobacillosis occurring in swine is far from satisfactory. In necrotic stomatitis, wherein treatment is begun early, good results may be secured. Necrotic rhinitis and necrotic pneumonia are very difficult, if not impossible to treat. In necrotic enteritis, intestinal antiseptics are indicated. Copper sulphate in one-half to one dram doses is probably by far the most satisfactory agent, for the relief of this condition. We have recently been informed...
that certain workers are advocating the use of bacterins or vaccines for the control of necrobacillosis.

Prevention and Control. Necrobacillosis may largely be prevented by removing the healthy animals, together with thorough disinfection of all houses, pens, and yards, where swine are kept. Incurable cases should be promptly destroyed, in order to prevent further dissemination of the infection. Maintaining swine in sanitary surroundings, also careful feeding, are of considerable importance in preventing the occurrence of this infection.

PRESIDENT WILLS: Gentlemen, Dr. Boyd's paper is now open for discussion.

DR. KINSLEY: Mr. Chairman, I think we have all enjoyed the doctor's report on necrobacillosis. The time question I presume limited his paper to the discussion of hogs. No doubt you are all familiar with the fact that the micro-organism is sometimes of very great importance in other animals. In Missouri we had some experiments with necrobacillosis in horses, in a city where the British were collecting horses, sometimes as many as twenty or thirty thousand. One spring, just as the frost was going out of the ground, it was very common for horses to scarify the skin above the hoof, and it was not exceptional to visit their hospitals and find perhaps a hundred and even ten times that many animals infected with necrobacillosis. We had quite a good deal of trouble on that account. I simply mention this as no doubt many of you have had similar experiences. Also, occasionally we found a troublesome condition in the form of anal vulvitis in cattle, or even affected prepuce in steers.

PRESIDENT WILLS: Does anybody else wish to discuss this?

DR. SCHWARZE: Mr. President, I would like to ask whether Dr. Boyd considers that this infection could be carried from a local lesion to the internal organs.

DR. BOYD: I think the lesions that would occur in the liver and spleen probably would be metastastic in their nature, and I think that they probably find their way there through the circulation, that is, lesions that occur in the liver and spleen.

DR. HILL: Mr. President, I would like a little more information from Dr. Boyd regarding his experience with contagiousness of the disease, as we have had one particularly striking example that is rather hard to overlook. We had an outbreak last year in a lot of 800 brood sows, 90 per cent of which had it in a very bad form, resembling foot and mouth disease, except that vesicles were not present. Of that 90 per cent, at least 80 per cent showed very bad affection of the vulva, the entire vulva being covered sometimes with one necrotic area, sometimes a dozen areas. We felt considerable apprehension at the time, but we realized that it was an exceptional case.

DR. BOYD: General speaking, I believe the disease to be quite infectious in young animals, and apparently it persists for quite a time. I know in one particular instance that it is very probable the breeder will have to discontinue raising swine for at least a year, because he has had very bad results with necrotic enteritis. His swine have also been infested with whipworm, and the two together have caused him a lot of trouble.

DR. BUTLER: Mr. Chairman, I would like to ask a question. You know that in sheep we have many different forms of necrobacillosis and it becomes very serious. I would like to ask Dr. Boyd if there is any way of differentiating between these different forms? By that I mean,
is it the same micro-organism in all cases? Is the same micro-organism found in hogs as in horses, sheep and cattle?

President Wills: Dr. Boyd suggests that Dr. Mobler answer that, as he is more familiar with sheep.

Dr. Mobler: Mr. President, it has been some time since I have done any work on the subject of necrobacillosis, but during the period from 1910 to 1912 an investigation was conducted which did not show any different results whatsoever from the organisms derived from the horses or from sheep, cattle, steer and wild animals. In other words, any organism obtained from sheep would cause lesions in horses or in cattle, or hogs, and vice versa. There was absolutely no difference at all in the micro-organism from one species, as compared with the micro-organism from another species.

Dr. Haslam: Mr. President, a question that has occurred to me for a long time in regard to necrobacillosis in pigs, is the predisposing effect, and particularly the relation to a mild infection of hog cholera. Dr. Boyd mentioned that it has been encountered very frequently to the greatest extent in the cases of vaccinated herds. He has also mentioned that it is at least reported as a normal inhabitant of the intestines of the hog.

The question that I am particularly anxious to get real information on is, the production of the disease, or the occurrence of the disease in immune hogs, and is the occurrence a sufficient length of time after immunization to make it certain that there is no cholera in attenuated form present in the herd.

I want to ask the doctor to give us in as great detail as possible the differential diagnosis between the necrobacillosis as the sequel of hog cholera, and pure necrobacillosis uncontaminated with hog cholera.

Dr. Boyd: In necrotic enteritis, which is perhaps the one that most people have confused with hog cholera, I would say that we would take into consideration first the history, obtaining as complete history as possible, and then resort to an autopsy. It is also necessary to know the age of the animal that is affected. We find it confined mostly to young pigs, shotes. The older animals are not so often affected, and the absence of certain typical lesions that are familiar in cholera, such as hemorrhage of the lymph glands, hematorrhea, or the discoloration of the skin and those things found in necrobacillosis; and also when the intestine is encised it is found to be more or less thickened. Necrobacillosis can be diagnosed or differentiated from hog cholera chiefly by autopsy and the history.

Dr. Gibson: Dr. Boyd, have you made observations as to temperature in this disease, as compared with cholera?

Dr. Boyd: I have found the temperature to be much lower in necrotic enteritis.

Dr. Connaway: Mr. Chairman, in the matter of the differentiation of these two diseases, I will say that it has given us a good deal of trouble. I think there is too great a tendency to pronounce an outbreak of hog cholera necrobacillosis when our serum does not save the hog. We cut into these hogs and find these lesions of necrobacillosis, and say: "This is not hog cholera. You cannot expect the serum to save these hogs." Well, you should not expect it to save a hog that is beyond redemption. The actual fact is that necrobacillosis requires a wound for the start. It does not matter how that wound is made, whether it is a barbed wire cut on the foot, or whether it is an injury about the lips, or whether it is a little hemorrhage on the inside of the intestines.
When we stop to study an outbreak of hog cholera and what it really is, I think we can explain many of these cases of necrobacillosis.

Years ago Dr. Law, of Cornell, and Dr. Salmon, at that time working for the government before the organization of the Bureau of Animal Industry, made some investigations, and the prettiest pictures that exist today of necrobacillosis are contained in one of those old line issues by the Department of Agriculture. They regarded these lesions as signs of cholera, as visible signs of cholera, and I think that they were pretty good diagnosticians. I think these lesions that we see today are good signs of hog cholera, not that the hog cholera organism has made them, but that they are superimposed on real cases of hog cholera. Hog cholera is septicemia, and it is septicemia in which sometimes we find no hemorrhage whatever.

In the very few cases of hog cholera that go onto the market, in some cases, no man on earth could tell what the hogs died of. They pass the inspector and go out to the country market and are sold. We all know that. We eat the meat and it does not hurt us, but when we feed it to a hog, we know it hurts the hog, because it contains that organism of necrobacillosis, along with the other; but in other cases, more acute, we find that there are minute hemorrhages on the inside of the intestines, and they become infected with all sorts of dirt organisms, for this bacillus necrosis is a dirt organism, and we find this disease on farms where the sanitary conditions are the worst. Frequently it will develop into those beautiful button ulcers which Dr. Law and Dr. Salmon forty years ago regarded as good signs of hog cholera, and I believe are good signs of those animals having been infected with hog cholera.

That those causes sometimes make an independent disease is a fact, and these button ulcers under certain conditions arise from other causes.

I saw a beautiful case of this one time on a farm in Missouri, where the pigs were attacked with something that looked like hog cholera. We ought to go a little bit careful on this matter of trying to throw so much of the responsibility for the death of animals on the necrobacillus.

PRESIDENT WILLS: Any further discussion?

DR. NIVEN: Mr. President, I have been working with this disease for the last two years, and have arrived at the conclusion that many cases of necrobacillosis are being treated for hog cholera with serious results. I have been treating a number of these herds within the last year for necrobacillosis and not cholera, and have had very good results, and this is a case where cholera is not present, or it would spread. We are saving practically all of them, if the farmers will continue to care for the animals as we direct. We have a number in which there is other infection involved, but at the same time this bacillus is undoubtedly present also, but there is also something else, because they have this organism which has affected different tissues. If you have a herd in a certain way, the next herd will be infected the same, indicating that there is some other trouble associated with necrobacillosis.

PRESIDENT WILLS: Is there any further discussion? I am very sorry that Mr. Pearson is not here, and I assume that he will be here.

DR. MOHLER: Mr. President, I have just received a telegram from Assistant Secretary Pearson, and he asks me to make his apology for not being present this morning, and further, he has asked me to make an explanation. I presume most of us saw about ten weeks ago a news item in the daily press, to the effect that the Governor of Texas had requested the President of the United States to send fifty million dollars to Texas to help out in the drought-stricken section of that state.
The telegram was referred to Secretary Houston, Secretary of Agriculture, who appointed Dr. Pearson as chairman of a committee to go to Texas to ascertain the actual conditions prevailing there. This morning he reached Forth Worth, and I am sure you will accept his apology.

President Wills: We are very sorry, of course, not to have this address by Assistant Secretary Pearson, but under the circumstances his duty is elsewhere.

This afternoon, in place of the paper on "Heated Hog Cholera Virus," by Dr. Reichel, who is not here, and who has not sent his paper, we will have a report from the Committee on Disease. Dr. Reichel was chairman of that committee also, but Dr. Kinsley, who is acting chairman, will make his report this afternoon.

If there is nothing further, we will adjourn until two o'clock.

TRANSMISSION OF HOG CHOLERA.
FOURTH SESSION.

President Wills: Gentlemen, we will have this afternoon a symposium on hog cholera, and the first paper is by Dr. Dorset, of the Bureau, on "Recent Studies on the Modes of Transmission of Hog Cholera."

Dr. Dorset: Mr. President, and gentlemen of the Association: When I attempt to assemble the facts that we have with relation to the way in which hog cholera is spread, I realize how very little I know about the subject. The question, however, is of fundamental importance. In hog cholera, as in all infectious diseases, the success of control measures is necessarily dependent upon the state of our knowledge of the ways in which it is disseminated; the channels of infection. For example, we know how Texas fever raged until it was found that it was transmitted only through the tick; how deadly yellow fever was until it was found by Dr. Reed and his associates to be transmitted by the mosquito. The struggle against typhoid fever has been greatly simplified through the discovery of the normal carriers of the disease. The same applies to numerous other diseases.

It seems to me with reference to hog cholera, that this subject has been very much neglected. There is little found in the literature with reference to the modes of transmission of hog cholera. The only definite statement that I have been able to find is contained in a report of the Department of Agriculture issued in 1889, nearly thirty years ago. This report is entitled: "Hog Cholera, Its History, Nature and Treatment," and in it we find named the sources and channels of infection in hog cholera as follows:

"A. Pigs purchased from infected herds, or coming in contact with those from infected farms, or running over grounds occupied by diseased swine within two or three months.

"B. Infected streams may communicate the disease to herds below the source of infection.

"C. Virus may be carried in feed, implements and on feet and clothing of persons from infected herds and premises.

"D. Winds, insects, birds (particularly buzzards), and various animals may transport hog cholera virus."

In other words, any agency that is capable of transporting any particle of matter from a farm where hog cholera exists, or has existed
within recent times, may become a conveyor of hog cholera. That is essentially what those statements mean. There is no question but that that description is broad enough to cover all possible sources of hog-cholera infection; It seems to me that there is no channel left open in that description. It is very comprehensive and if it were possible to close all the channels named, I think there would be no trouble controlling hog cholera; but, unfortunately, it is not possible to control all of these various channels through which it may be conveyed.

Therefore it would seem to be of prime importance to study all of the various ways in which hog cholera may be conveyed, and, if possible, find out those particular channels which are of most importance, to locate the point of greatest danger, the weakest link in the chain of our defense against the disease.

That has been the idea that we have had in mind when we started this work. We realize that, although we have been working a little more than a year now, the subject is so vast that it can hardly be expected that one set of workers will decide this important question permanently and for all time.

Therefore, our experiments, are presented for their suggestive value. They show what we have found, and we hope that others who carry out experiments along these lines may profit by and improve upon our work.

The experiments, of which I wish to speak, were begun in the summer of 1916, under the immediate control of my associates, Dr. McBride, Dr. Niles and Dr. Rietz, and these various experiments have been continued practically in an unbroken line since that time, down to the fall of 1917, or a little over a year.

Last year I described some of the early work. This year I wish to cover some of the same ground, with the added experience gained within the past year. As I have already stated, however, not with the belief that we have discovered the key to the control of hog cholera, but merely with the idea of giving you the benefit of the observations we have thus far made.

First, with respect to the pigs themselves. It is not necessary for me to argue that pigs convey hog cholera, we all know that. Last year I quoted from our experiments to show that infected pigs conveyed hog cholera, not merely when they were visibly sick, but in all stages of the disease, in the stage of incubation, as well as in the very latent stages of the disease; in fact, we did not find any time, so long as the pigs remained sick, when they were not infectious.

Last year, we showed that virus is thrown off from the bodies of sick pigs in the urine, in the feces, in the secretions of the eyes and of the nose. We have continued the experiments with respect to these secretions.

In the first experiment that I wish to report on this year, the blood, urine, feces, eye and nose secretions, were collected from a pig which seven days previously had been infected with hog cholera. The eye and nose secretions were collected on sterile cotton swabs, and placed in sterile normal salt solution. The feces were collected in sterile jars, as voided; and suspended in sterile normal salt. The blood was defibrinated, the urine was injected as it was collected.

These materials were tested in the following way. Two pigs were immediately injected with portions of each of the five materials I have named. Each lot of material was held in the laboratory at room temperature for 24 hours, when two more pigs were injected with it. The material was held still further, 48 hours in all, and two more pigs injected.
We therefore tested the infectiousness of these secretions, excretions and blood when they were fresh and when 24 hours old, and 48 hours old, the materials having been held at room temperature in the meantime. The maximum temperature during the period was 89° F. and the minimum 66° F. and the mean was 78° F.

As a result of these injections, all of the pigs injected with the different fresh material contracted hog cholera; all of those injected with the materials that had been kept for 24 hours contracted hog cholera, while at the end of 48 hours those injected with the blood, urine and feces contracted hog cholera, but those injected with the eye and nose secretions did not.

It appears that in this case the virus did not survive outside of the animal body 48 hours, when derived from eye and nose secretions.

The second experiment was very similar, except that in this experiment no blood was used, and the excretions and secretions were collected on different days instead of one day. In the second experiment we collected these various secretions on the second, third, fifth and seventh days following the infection of a pig with cholera. On each of these days immediately after the material had been collected from the pig, two pigs were injected subcutaneously with each material, two fresh pigs being injected each day with each material; but we had another series this time. We decided to feed the virus in addition to injecting it, so that we had a second set of pigs which on the second, third, fifth and seventh days were fed respectively the urine, the feces and the eye and nose secretions. The same amounts were fed that were injected.

In addition we had a third series of pens, and in these, secretions were scattered each day, but the pigs were not fed or injected.

The nose secretions were scattered in one pen; in the next pen the eye secretions were scattered; in the next one, the urine; and in the fourth, the feces. This was done on each of the four days.

The injection tests, which have proven infallible right along as far as infection is concerned, showed that none of the pigs that got the material collected on the second days of the disease were affected. The virus had not yet appeared in the secretion and excretions on the second day. On the third day all of those that were injected contracted the disease, except those that received the urine. On the fifth day they all contracted disease from the injections and the same was true of the materials collected on the seventh day.

With respect to feeding, the pigs that were fed four times with the urine, feces and nose secretions all remained well. There was no infection whatever in these pigs; whereas one of the two pigs that was fed the eye secretions at different intervals contracted the disease and communicated it to his pen mate.

In the pens where we scattered the virus, all the pigs remained well, except, in one instance, one pig that was exposed to the secretions from the nose contracted hog cholera.

In this experiment also we held some of the material that we collected on the seventh day. We saved some to again test the duration of the life of the virus outside of the animal body, virus contained in the urine, the feces, the eye and nose secretions. These secretions were tested after standing 24 and 48 hours. All produced disease at the end of 24 hours; but at the end of 48 hours the eye and nose secretions again failed to communicate disease. This experiment in that respect confirmed the previous one, in which the eye and nose secretions seemed to lose their virulence after 48 hours, though the urine and feces did not.
In testing the secretions from hogs, we conducted one more experiment. In this experiment the urine, feces, eye and nose secretions were collected on the third, fifth, and seventh days. At each time of collection, two pigs were injected subcutaneously with each material, two being fed and two being exposed by scattering the infection. Different pigs were used for the injection on each day, that is the third, fifth and seventh days, whereas with the feeding and scattering, the same two pigs were exposed on each day so as to renew the infection.

All of the pigs injected contracted hog cholera, except those which received urine collected on the third day. None of the pigs that were exposed by feeding or by scattering the virus in the pens contracted disease, though in this case and in other cases which failed to contract disease, the animals proved susceptible later when exposed to hog cholera.

To summarize these results, it seems that virus is cast off from sick pigs in the urine, feces, eye and nose secretions, without question, and that the disease is readily conveyed by injection, but much more, certainly by feeding or by scattering in pens.

The virus in the eye and nose secretions seems to be more readily—and I say seems to be, because with only two experiments, I wish to make the statement with all reservations—the virus in the eye and nose secretions, seems to be more readily conveyed by scattering or feeding than virus from the urine or feces. I make this statement because the only successful results we had with virus used in that way were with virus derived from the eye or nose.

Virus in the eye and nose secretions appears to succumb outside of the animal body more quickly than virus in the urine and feces, as was shown in both experiments. In 48 hours the virus had succumbed. The weather was warm in both cases. We are trying it out in cold weather now, and expect to make a further study of it.

Last year I reported that we had tested two recovered pigs to see if they were carriers of cholera, and we found that they were not. We tested them by withdrawing blood from the tail; by exposing susceptible pigs in the pen with them, after they had previously been cleaned and disinfected, so they would not carry the virus on the outside of their bodies, and thus proved that neither one was a carrier. Since that time we have had the opportunity to test two more pigs that had a typical form of hog cholera. Approximately 30 days after they had made a good recovery, they were scrubbed and disinfected, and put in a pen with susceptible pigs, and their blood was drawn and injected into susceptible pigs, but none of the injected pigs contracted cholera. Neither one of the recovered pigs was a carrier of hog cholera. Those observations are submitted as a very slight addition to our knowledge of recovered pigs as carriers of cholera.

There is no doubt whatever in my mind as to the danger of infection from a pig that has not thoroughly recovered. I am speaking of recovered pigs, not of old chronic cases of cholera.

Last year I spoke of the survival of the virus of hog cholera in carcasses. I reported that we had buried four carcasses in the summer when the weather was quite hot. Portions were exhumed at intervals. After seven days, we found that three carcasses no longer produced cholera when fed to susceptible pigs. One did, but the infectiousness of the fourth carcass disappeared after fourteen days. As the weather was warm the process of putrefaction had probably a good
deal to do with the early disappearance of the virus in the carcasses, so we repeated the experiment this year.

Three pigs that had died of cholera on the 2nd of November, 1916, were cut into large pieces. Portions were fed to susceptible pigs to prove the virulence of the material, fresh, and on the same day the remainder of the carcasses were buried. Two of the carcasses were buried in sandy soil about two and a half feet deep, and the third one in clay soil about two and a half feet deep. Portions of these carcasses were exhumed at intervals during the winter and spring, and each time two pigs were fed with muscular tissue obtained from the carcasses, the muscular tissue being finely chopped and mixed with bran mash.

The results of those experiments showed that in one of the carcasses that were buried in sandy soil, the virus survived eight weeks, but apparently had disappeared in twenty weeks. In the second carcass buried in sandy soil, the virus survived 27 weeks, but had disappeared at the end of the thirty-first week. In the third carcass, buried in clay soil, the virus survived 34 weeks, but had apparently disappeared at the end of 36 weeks.

Besides these tests, two carcasses were left exposed on the surface of the ground, not covered in any way, but in a wood lot where some sun could get to them. One was exposed on the 20th of January, and the other on the 8th of February. In one the virus survived for ten weeks, but had apparently disappeared at eleven weeks. In the other it survived eleven weeks, but disappeared in twelve.

These two sets of experiments show very clearly the danger from unburied or improperly buried hog carcasses, and they suggest that it would be advisable to burn them up. If they are buried, they certainly ought to be buried so deep that there will be no danger of their being exhumed by dogs or other animals.

With respect to the mechanical conveyance of hog-cholera infection, I last year spoke of some experiments that we had carried out. Two attendants walked daily through pens containing sick pigs, and from there through pens where susceptible pigs were kept, about fifty yards away. In two experiments, where the attendants made visits to the pens daily the exposed pigs remained well.

This year we have increased considerably the number of pens that we have in this work. While there has been no question in our minds, as to the possibility of conveying hog-cholera virus in such a way; we wanted to know what the probabilities were, and what percentage of danger there was incurred in this way. We have, in all, exposed 14 separate pens of susceptible pigs. The attendant walked through the virus pens and took particular pains to walk in the parts that were soiled with the excretions of the pigs, and in visiting two of the exposed pens he was particular to put his feet into the feeding trough. Dr. Reitz himself did this work, as we wanted to be sure that it was done right, and we are sure that it was. Seven pens of susceptible pigs, the same sort of pens, similarly located, were used as controls, but these were not entered by anyone during the experimental period. Otherwise they were the same as the exposed pens.

Of the 14 pens that were exposed by means of daily visits in this way from the attendant with infection on his feet, eight were exposed daily for 17 days; 4 daily for 19 days; 1 daily for 23 days; and 1 daily for 60 days. As a result, cholera developed in 2, in one case 16 days, the other 17 days after the beginning of the exposure, and in one of
the 7 control pens cholera developed 17 days after the beginning of the experiment, although, as I stated, the pigs in these were not purposely exposed in any way.

It seemed rather unfortunate that these control pigs became sick. The same percentage in the control pens were infected as in the exposed pens, one out of seven and two out of 14. I think it is only fair to conclude that those that were exposed to infection through the medium of the attendant were actually infected by him. Even so, it seems very remarkable that it was possible to walk through infected pens daily and into pens with susceptible pigs 50 yards away, and not carry the infection every time. That has been the surprising thing to me. I am not surprised that it was done at times. I am surprised that infection did not always occur.

And yet we ought to remember that these experiments are in agreement with the other experiments I have just described, where we found that out of eight lots of susceptible pigs exposed to these secretions by scattering excretions from sick pigs in the pens with them, or by feeding, only one lot developed hog cholera, about the same proportion that we have here. It seems as though it is not very easy to give a pig hog cholera that way. There is no doubt about the virus being carried to them, but they simply did not contract disease.

We have conducted another experiment relating to the carrying of virus. This experiment perhaps some of you may have seen if you have been in Ames recently. It is an experiment which we have been carrying on for a long time with pigeons, and it may be of interest to you.

Two small pens about five feet square were placed facing each other, ten feet apart. The space between them was covered with wire netting. The front of the pens was closed up to a certain height, so that the pigs could not get out, but sufficient opening was left so that the pigeons had free access to both pens, the pigeons being placed in the enclosure between the two pens. Two sick pigs were placed in one pen, and two susceptible pigs in the pen opposite. Six pigeons were in the enclosure between the pens. No feed was given to the pigeons in the areaway between the pens, so they were forced to go into the pens with the pigs to get their food, which they did, and they were seen regularly, first in one pen and then in the other. The infected pigs in the pen became sick and promptly died, while the susceptible pigs that were exposed through the pigeons remained well. The pigs that died were replaced by two other infected pigs and they also sickened and died. The exposed pigs had meanwhile continued well, so they were taken out and put into the pen where the infection was, and two additional non-immune pigs put in the non-infected pen. The pigs that were changed to the infected pen contracted hog cholera and died. These were replaced with two more infected pigs, and when they sickened and died, by two more. All the while, during a period of several months the susceptible pigs remained perfectly well. There was never any transference of infection from the sick pigs to the others by the pigeons, although they frequented both pens.

We ought not to be surprised that the pigeons did not carry the disease, as we know that the disease is not always carried by men.

Studies of the infectiousness of pens, which I also reported on last year to a certain extent, have been carried through the winter, in fact, have been continuously going on since August, 1916. We have used for this work five kinds of pens with concrete, board, clay, sandy loam, and sandy floors; the average size being five feet square. They are
all covered, and in all cases the floors were at least partially protected from direct sunlight; that is, there were parts of the pens that the direct sunlight did not strike. These pens were each infected by having infected pigs placed in them. Sometimes there were only two infected pigs. Sometimes if the pen was a little larger than the average, there were more. The infected pigs were removed only after death or when in a moribund condition. The infectiousness of these pens was determined after certain intervals of time by placing susceptible pigs in them. When the sick pigs were taken out, the pens were not cleaned, and feed troughs and unconsumed feed were left in the pens undisturbed.

We have made sixty tests of pens in this way to determine the survival of virus in these pens. Of the tests, 22 were made between June 15th and October 1st, that is, 22 tests in the summer time. The infectiousness of the pens was tested 24 hours after the sick pigs had been removed. Of these, two proved to be infectious. Cholera developed in the exposed pigs in two of these 22 pens. The pigs in the other 20 pens remained well, and were proven susceptible later by the injection of hog cholera virus.

From October 1st to June 1st 38 tests were made. In these winter tests, it was soon found that the infectiousness lasted longer than it did in the summer. During the winter period the infectiousness of the pens was not always tested after 24 hours because it was found to persist beyond that time. Eleven of these 38 winter tests were made after 24 hours, of the remainder, some were tested for infectiousness in two days, some four days, some seven days, some 13 days and some 21 days after the removal of the sick pigs.

Of the 38 tests made in this way, 20 pens were found to be infectious, although we waited in the winter time considerably longer before we exposed the pigs than we did in the summer, yet we had a far greater percentage of infectious pens in the winter than in the summer. In other words, over 50 per cent of the pens in the winter remained infectious as against less than 10 per cent in the summer.

I think we are entirely justified in concluding that hog-cholera infection in pens survives much longer in winter than in summer, and that hog-cholera infection occurring on farms in the late fall and winter is more dangerous and requires more attention on the part of the veterinary sanitarian than disease in the summer time, when the sanitarian has the aid of nature.

Now I have described to you very briefly some experiments which have meant a great deal of work to Dr. McBride, Dr. Niles and Dr. Reitz, and yet it does not seem that I have told you very much. Perhaps, however, this may be the beginning of our finding out more definitely the way in which hog cholera is spread through some particular channel. I do not believe that we have as yet found the particular channel which, if we could only grasp and understand, might tremendously simplify the whole question of hog-cholera control.

It seems to me that if these experiments establish anything, they establish that under natural conditions, the greatest danger is the sick pig. We have never had any trouble transmitting the disease when we put a healthy pig with a sick one, and therefore sanitarians should pay particular attention to watching the pigs, watching any movement of swine that takes place in the country, for example, the present unprecedented return to the farm of pigs from stockyards. I think that is a very important thing, and that every possible care should be taken to avoid the dissemination of cholera in that way.

The next thing in the experiments that strikes me as being perhaps
suggestive, is the difficulty of transmitting hog cholera by mechanical means without the intervention of the pig. That we should have had that trouble was wholly unexpected. Of course, we realize that pens are infected; that men do carry infection into pens sometimes, and perhaps pigeons carry it sometimes. I do not think that there should be any relaxation of the rules and regulations that require the isolation of cholera pigs to prevent the mechanical carrying, though I do not believe that that is as great a danger as most of us have believed in the past.

Sometimes I wonder why, if it is so difficult to transmit cholera mechanically, that disease can spread so rapidly and so generally over the country. Taken with the very marked seasonal prevalence of hog cholera, and with the fact that it is so easily transmitted by a puncture under the skin or by subcutaneous injection, one cannot avoid the thought of an insect-carrier in hog cholera. I do not put this idea forward with any particular claim of originality. I have no doubt that everyone who has thought about hog cholera, has thought of insect carriers, and these experiments simply cause one to think a little more about the possibility of an insect carrier of some sort.

Another surprising thing to me has been the rapid disappearance of infection from pens. In the summer time usually in our experiments it was within 24 hours. I do not suppose in practice it would be so short as that, but it is evident that the infectiousness does not persist very long in the summer.

I do not want to be guilty of heresy, but I cannot help wondering, whether, considering how difficult it is, whether too much work is not done in disinfecting with chemicals. We must realize that thorough disinfection of a farm, even under the best conditions, is almost impossible. These experiments indicate—and in that they are in agreement with experiments that were completed before ours by Sir Stewart Stockman, of the British Board of Agriculture, that virus dies out rather promptly, and that nature does a good deal of work, and that perhaps the chemical disinfection of a farm may be unnecessary labor and expense.

It has rather seemed to me that the time and labor spent on the disinfection of a farm where there has been cholera would, perhaps, yield better results if applied to cleaning the place, removing the rubbish, and exposing everything to air and sunlight. It has seemed also that the farmer might be better off, and that you might be better off, if the money he spent for disinfectants were applied to the purchase of anti-hog cholera serum.

On the other hand, it seems to me that disinfecting is clearly needed in such places as stockyards, where hogs are coming and going. Of course disinfectants must be applied in such cases very liberally.

PRESIDENT WILLS: Dr. Reichel is not here, but before we discuss Dr. Dorset’s paper, we will have the report of the Committee on Hog Cholera, by Dr. Connaway.

Hog Cholera Control.

DR. CONNAWAY: Mr. President and gentlemen of the Association: The Committee on Hog Cholera Control consisting of Dr. Hirleman of Georgia, Dr. Bolser of Indiana, Dr. Cahill of Massachusetts, Dr. Gibson of Iowa, Dr. Cooley of Ohio, and myself, are all present except Dr. Hirleman.

A questionnaire was sent to the veterinarians and others engaged in regulatory and associated work relating to hog cholera, but unfortu-
nately they were not sent out in time for all the replies to reach us before this meeting; but the members of the committee have talked with their colleagues here, and we are able in some measure to make up the shortage.

Considering the matter as a whole, before taking up special phases of the subject, your committee is of the opinion that, while there is much to be done before the ideals of the association are reached, material progress is nevertheless being made toward the better control of hog cholera. And that this progress is due to a closer adherence to sound principles of sanitation, proper quarantine, and proper disinfection; and by the better education of the veterinarians and other sanitary officers, engaged in this work, in a knowledge of the disease, and the specific measures that are necessary for its control and eradication. Moreover, the further education of the hog raisers in matters of farm sanitation, and their intelligent co-operation with the sanitary officers, are important factors which are contributing to the progress that is being made. Progress is not being made as rapidly as the members of the committee would like, nor as the members of this association desire. But a task so great as the effective control and ultimate eradication of hog cholera cannot be accomplished in a day. We will have to be patient, follow right lines, and labor without ceasing; and ultimately we will succeed.

I believe that all members of this Committee feel that the same principles, and in the main the essential practices, that have been applied to the eradication of foot-and-mouth disease, and that are now being applied to the eradication of "tick fever," must, in proper time, be resorted to for the eradication of hog cholera; that is, every feasible and practical means to destroy the infection should be applied. And we should constantly keep in mind that hog cholera is an eradicable disease. The experiments just reported by Dr. Dorset, showing that the infection is not so readily carried upon the shoes of men and the feet of birds (pigeons), as was once thought, gives us hope that the means of transmission are few, and that the solution of the problem of complete control and ultimate eradication of this disease is not far off. Dr. Dorset put the emphasis in the right place when he stated that the "sick hog" is the most dangerous carrier of cholera infection. This implies that quarantine measures for the control of the infected animal are of prime importance. And again the fact that, in the experiments referred to, the experiment pens, with the litter contents, proved infectious in every case, emphasizes the need of directing attention more strongly to the thorough disinfection of the feeding pens and sleeping quarters which have been recently occupied by sick hogs; and not to attach undue importance to the dangers from infected swine excretions which may have been dropped on fields where the opportunities to ingest the infection are not so numerous, and where the sunshine and other natural disinfecting agencies will in time destroy the infection.

In the questionnaire, information was sought under the following general headings: (1) Prevalence of hog cholera in the state or district, and losses from same; also the causes of increase of outbreaks in any section, and causes of decrease. (2) Interstate shipment of swine, and relation of same to the spread of cholera. (3) Intrastate shipment of swine and relation to spread of cholera in the state. (4) Stock yards and stock car sanitation and relation to control of cholera. (5) Questions relative to farm sanitation measures and effectiveness of same in preventing hog cholera. (6) New laws, sanitary board rules, appropriations, etc.
1. Concerning the prevalence of hog cholera, our information indicates: that during the first half of the year there were comparatively few outbreaks in any part of the country, a condition similar to that which prevailed throughout the greater part of the previous year, 1916. And you know that during that year, as compared with 1915, there was but little cholera. The excessive heat which prevailed during the summer of 1916 no doubt destroyed considerable hog-cholera infection over a large area of the hog raising states and aided in no small way in lessening the number of outbreaks of cholera during that year, and the early part of the present year. While we as sanitarians are doing our bit, we would be ungrateful not to acknowledge that the Almighty and his natural forces aid us wonderfully in the control of infectious diseases. During the past two or three months there has been some increase in outbreaks of hog cholera, particularly in the "soft corn" territory. The shortage in the local supply of hogs and necessity for the rapid importation of large numbers of hogs to utilize the corn crop in areas where early frosts prevented the corn from properly maturing, has led to a temporary relaxation in the interstate and intrastate regulations relating to the shipment of swine and consequently there has been an increase in outbreaks of cholera. In these outbreaks heavy losses have in the main been prevented by the liberal use of hog-cholera serum. It was considered by the sanitary officers of the states concerned as an emergency which justifies the risks taken.

In some states cholera is more prevalent in localized sections where in previous years very little special sanitary work had been done and where the swine raisers were not making proper efforts to save their hogs, while there is less cholera in other parts of the same states where in previous years proper sanitary and educational work has been done.

An important fact was brought out by our question, as to the prevalence of hog cholera in a state, and the money loss from same, i.e., but few officials were able to give any definite information in regard to the number of outbreaks and the losses from this disease. The reason is that few states have efficient agencies for the collection of such data. My own state as well as many others is deficient in this matter. Dr. Luckey, our state veterinarian, in his reply stated that he did not have much faith in any of the statistics that have been presented in the past concerning losses from hog cholera. He regarded such statistics as guess work, but realized the need of accurate data concerning these matters.

Your Committee believes that this association should work for the establishment in each state of efficient agencies to collect and publish as full and accurate data as possible concerning the losses of farm stock from various diseases.

In addition to hog cholera, which was held responsible for the greater losses, some of the state sanitary officials reported "swine plague," "infectious pneumonia," or "hemorrhagic septicemia," and "necrobacillosis" as being infectious causes responsible for a portion of the losses; but few indicated the percentage of outbreaks or deaths from these associated complicating infections.

To the question, To what important causes do you attribute an increase of cholera outbreaks in any section of the state? One or more of the following replies were given: lack of compliance with the regulations relating to movement of sick or exposed hogs; driving over roadways to shipping station; bringing in carlots of infected hogs for feeding purposes; neglect of swine raiser to burn or bury cholera in-
fected carcasses; lack of proper knowledge on the part of many swine raisers concerning the infectiousness of cholera; delays in vaccination of sick or exposed herds.

The decrease of cholera outbreaks in areas previously infected were ascribed to better sanitation, a better knowledge of the use of serum, particularly to the use of larger doses of serum than formerly, better cooperation of the swine raisers with one another and with the sanitary officers. Some reports give simultaneous vaccination the principal credit for the lessened amount of cholera in previously infected territory. Better general care of hogs by the swine raisers on account of scarcity of hogs and high prices is also mentioned.

2. In regard to the interstate movement of swine, and relation of same to the spread of cholera, the special regulations of the different states to prevent the introduction of cholera through importations have been collected and printed by the United States Bureau of Animal Industry in a convenient pamphlet which is available to the members of this association. A recent compilation of the Quarantine Rules and Regulations of the United States Department of Agriculture, the various states and territories, the Dominion of Canada, and the Republic of Mexico, has been issued by the western and southern railroads in Supplement 93 to Circular No. 5-B. This can be procured through your local agent or from E. B. Boyd, Agent, Chicago.

It will not be necessary to comment on the regulations of any particular state, but the results of our inquiries emphasize the pertinence of urging this association to labor more vigorously for greater uniformity in the state requirements for the admission of swine from other states. We realize that the conditions in different states may differ considerably, but the conditions and needs. of the different states, in the matter of live stock sanitation, certainly do not demand the great variety of regulations or lack of regulations that we find. In some states there are no restrictions of any kind to the admission of swine. Some states require official veterinary inspection and a bill of health. Some require a period of quarantine at destination. Some require vaccination before admission, while others allow vaccination at destination. When the "serum-alone" treatment is used, some states will admit the animals without delay, while another state requires fifteen days' quarantine before admission. And if the "serum-virus" method is used, one state at the present time will permit immediate shipments with a period of quarantine at destination. Some states accept "serum-virus" treated hogs seven days after the treatment, if healthy at time of shipment. (A recent regulation of the United States Bureau allows the interstate shipment of "serum-virus" treated swine after seven days' detention. This perhaps is an emergency or war measure to prevent the loss of large quantities of "soft corn." ) Some states require fourteen days' detention before admission of "serum-virus" treated hogs, other states twenty-one days, and some thirty days. These diverse regulations must be very confusing to swine breeders and shippers, and it will not be creditable to this association if such conditions continue.

The essential purpose of sanitary regulations applying to admission of live stock to a state is to prevent the imported animal from carrying infection that will endanger the health of other animals within the state. And it would seem that the essential requirements could be met by some simple uniform plan.

The National Swine Breeders' Association at their meeting last night discussed the need of uniform regulations for the shipment of breeding
swine. They do not want to sacrifice safety, but they do want a more sensible system than we now have, and they appointed a committee to confer with this association. They evidently believe that this body can solve the problem. We should not disappoint them.

Our correspondence with the live stock departments of the railways of the corn-belt states indicates that the Federal regulation issued by the Bureau of Animal Industry "Prohibiting the Interstate Movement of Dead Animals" has aided materially in preventing the spread of cholera infection not only in interstate traffic but in shipments within the state. Our general live stock agent writes that he has instructed all agents to comply with the regulations "whether for state or interstate shipments." He has adopted the regulation as a traffic rule of his road for local purposes; and says: "We can safely say that these regulations are being complied with so far as loading dead animals are concerned."

Concerning the intrastate movement of swine our information shows that much less attention has been given to this matter than to the control of importations from within the state. The same dangers exist in the two cases, if cholera infection is present on the premises from which the swine are shipped. The same or equivalent safeguards should therefore be applied. It seems unreasonable for a State to require an official veterinary inspection and health-certificate for an interstate shipment of swine which may be transported only a few miles, while no adequate sanitary restrictions are imposed upon the shipment of swine a hundred miles or more within the state. Recent improvement in this respect has been made in some states but there is room for more improvements.

Our inquiries show that many states have regulations against "driving sick or exposed hogs over the public roadways" to shipping stations, or permitting them to "run upon the commons." These regulations have proved helpful in preventing the spread of cholera; and are observed best in localities where systematic educational work, relating to hog-cholera control, has been carried on.

Some states permit the "hauling of sick or exposed hogs" over the rural roadways to the local shipping yards for shipment by rail to the large slaughtering centers. One report specifies that the "bottom and sides of the wagon shall be tight, and shall be thoroughly disinfected after use, under supervision of the local live stock sanitary agent." Also that "hogs shipped in for feeding purposes must not be unloaded from cars into the yards at destination, but must be loaded directly into wagons and hauled to the farm." Another state permits the hauling of sick or exposed hogs direct to a slaughter house, but prohibits their being hauled to the local shipping yards for shipment to the central markets.

4. The reports on farm sanitation measures and cholera control show an increased interest in the application of appropriate sanitary measures upon the farms for the control of hog cholera; such as the isolation of the sick and exposed hogs, the burning of dead hogs, and carcasses of other animals which may attract infection carriers; and the cleaning and disinfection of feeding pens and hog houses.

In states where educational work along these lines has been carried on by the State and Federal agencies, through lectures and practical demonstrations, excellent results have been reported. The farmers are thus coming to realize the value of voluntary application of the measures recommended.

Too much emphasis can hardly be placed upon the importance of
the co-operation of the swine raisers in the control of hog cholera, and the part they must do in carrying out proper sanitary measures.

5. As regards stockyard and stock-car sanitation, it is the opinion of our Committee that more attention should be paid in the future to this phase of the question. Our inquiries show that cars and the local shipping yards are sources from which hog cholera infection is often distributed, in the farming districts. The replies to the questionnaire show that but little attention is being paid to the disinfection of the local shipping yards, nor to the stock cars which bring in car lots of feeding swine. It is our opinion that the transportation company and the consignee should be made responsible for the thorough disinfection of the car and bedding immediately after unloading a lot of feeding swine, at the destination in a rural district. Also that the transportation companies should be required to disinfect the local shipping yards at regular stated intervals, prescribed by the State Live Stock Sanitary Board, or by the Federal Bureau of Animal Industry, if such yards are used for interstate shipments, and that such additional disinfections shall be required as emergencies may show to be necessary.

6. As to new laws, recent board rulings and appropriations, in the different states, for hog-cholera control work, our information is incomplete. Some states report that no new laws, nor special appropriations have been made, but that fairly satisfactory work is being done under old regulations and with funds from the general budget for control of infectious diseases. Where special appropriations have been made these vary from $2,000 to $25,000 for the year. In my own state, Missouri, the last legislature amended some of the old laws which had been found defective, as for instance the law relating to the "burning of dead animals." A special appropriation of $50,000 was also made for the biennial period, January 1, 1917, to January 1, 1919, for hog-cholera control work. This appropriation was made to the State Board of Agriculture and will be expended under the direction of the state veterinarian. The official force of deputy state veterinarians has been increased from 95 to more than 200 appointees. Four members of the staff are on annual salaries varying from $1,500 to $3,000, and give their full time to the work of the department. The remainder who are local practitioners, receive a per diem compensation of $5.00 and expenses, for the actual time employed upon a state case. The appropriation for the present biennial period did not become available until about the first of April; and it is therefore too soon to estimate or predict the full results from its expenditure. But if the large veterinary staff is efficiently trained and properly utilized, no serious outbreak of hog cholera should again occur in the state, for the appropriation became available at a time when hog cholera was at its lowest ebb for several years, and the task should accordingly be much lighter.

In connection with this work an effort is being made to utilize the services of the school board clerks of the rural districts, in reporting all suspected outbreaks of hog cholera to the deputy state veterinarian practicing in the county, or to the nearest one available; as some counties have two or more official deputies, while several counties have none.

Under instructions from the state veterinarian, the local state deputy must visit the farm reported, diagnose the case, and if advisable vaccinate and quarantine the herd, and give instructions for prevention of the spread of infection to the neighboring farms. No charge is made to the owners of the sick herds, except the cost of the serum used.
owners of exposed herds on adjoining farms do not get free service, if their herds are healthy at the time of the visit of the state deputy to the neighborhood; nor if the disease should spread to their herds later. The local deputy reports the names of the owners of exposed herds to the state veterinarian, who mails a circular letter giving notification of the presence of the disease in the locality, and advising vaccination and co-operation to prevent the spread of the infection. Or the local deputy may himself notify the owners of exposed herds, and advise them to take proper precautions to prevent their herds from becoming infected. And if they desire to have their herds vaccinated, this becomes a private case in which the state is not concerned financially, as the owner must pay for the veterinary service, as well as for the serum used.

The work of the state veterinary forces, as mentioned above, is supplemented by fifteen veterinarians employed by the U. S. Bureau of Animal Industry upon a project which has been designated as "intensive regulatory work" for control of hog cholera, and which is an extension of the county demonstration plan in a modified form. Similar work is being carried on in several states, and you are familiar with the details of this plan from reports of the bureau officials.

The extension departments of the state horticultural colleges of several states are also supplementing the regulatory work, by educational projects (lectures and practical demonstrations), carried on in various parts of their respective states. The staffs of the state serum laboratories of several states are also contributing their official aid toward the control of this disease. It thus appears that while some states may be short of official aid, others are well provided so far as numbers of veterinary officials are concerned. And if in the latter case effective work is not done, the fault will lie in some defect of the plan, or in a lack of proper co-ordination of the several official agencies engaged in the work, or to lack of special training and proper utilization of the personnel of the different agencies; and perhaps to some extent to pernicious politics, and to commercial alignments which put personal considerations above honest and efficient service for the live stock industry.

There are still grave differences of opinion as to the best methods and best organization for the control and ultimate eradication of hog cholera. The replies to our inquiries show that some believe that the most effective work can be done by the employment of a comparatively few well trained specialists in hog-cholera sanitary work, who give their entire time to these duties; rather than to expend the same amount of money for part time service upon a larger force of busy local practitioners. The divided interest, lack of time, haste due to the pressure of private practice, lack in many cases of proper training for public sanitary work, all militate against the most effective work in hog-cholera control, by the local practitioner. A private practitioner may be an excellent vaccinator and give his patron satisfactory service in saving a herd of swine, and yet not be an efficient sanitary officer, who will give the farming community the best service in controlling and eradicating this disease. The saving of a herd of hogs is an important matter, but the extermination of the infection is of greater importance. The private practitioner need not be disturbed in the individual service he renders a patron in saving his herd from cholera. But it is questionable whether the sanitary service rendered the community by the private practitioner, for the reasons mentioned, justifies the expenditure of public funds in the employment of this group for part time service in hog
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cholera control work. This is an experiment which is being tried out on a large scale, in some form, in several states, and the results will appear in time. And if not wholly successful in controlling and eradicating hog cholera, will nevertheless aid greatly in the improvement of the veterinary service, as it relates to private practice. This educational service to the profession may alone be worth the experiment.

We are evidently still in the experimental stage of hog-cholera control work. But we should not be discouraged, for out of the large and expensive experiments that are being made in many states some practical and effective plan will be evolved, which will not only save the hogs, but also eventually exterminate the infection.

There are other phases of the subject which it was our purpose to investigate and report upon, such as the educational, and the research features relating to hog cholera. Also an inquiry concerning the cooperative relations of the various official agencies concerned in hog cholera work, in the different states. Also to secure information concerning improvements in the commercial production of the anti-hog cholera serum, and improvements in the field use of serum in the different states, but lack of time and the magnitude of the task has prevented the Committee from exhausting the subject. We leave an ample field for subsequent committees to explore and report upon. There is one matter, however, which I wish to mention before closing, and which is suggested by a study of the literature and "dosage tables" which the various commercial serum companies have kindly sent me. And that is a need of a uniform dosage table for a product which is supposed to be practically uniform, since it is made under rules and regulations prescribed by the U. S. Bureau of Animal Industry, and it is doubtless as nearly uniform as it is practicable to make it, considering our present state of knowledge concerning the causative agent of this disease. The lack of uniformity in the dosage recommended by different serum producers, and by serum distributors, must be confusing to many practitioners, and especially to the young practitioners, who have had little field experience in hog-cholera vaccination. The conditions are comparable to having two or more different currencies, or standards of weights and measures. There can be no defensible justification for two or more distributors of the same serum prescribing different dosages, or a dosage different from that recommended by the serum producer. It would be better in my opinion to have printed on the labels of all serum, a uniform minimal dosage, which should by no means be scant, and which all serum producers could agree upon; or which the U. S. Bureau of Animal Industry could prescribe as a requirement for interstate shipment; and leave to the intelligence and good judgment of the veterinarian in the field any variation in dosage, which the local conditions may demand.

The only objection that could be raised, with any valid reason, is a commercial one, and not a professional one, namely, the need to dispose of an overstock of old serum, the potency of which may have diminished from age or other cause, and which the producer prefers to market at a reduced price rather than to reinforce it and bring it up again to the standard requirements; or when in a great emergency, the general supply does not meet the demands, and the producer may need to fill the orders of his patrons without delay by drawing upon batches which have fallen slightly below the requirements of the test. Under stress of these conditions the producer can plausibly urge that "potency" is quantitative rather than qualitative; and that a large dose of a weak
serum contains as many “immunizing units” as a smaller dose of a more potent serum, and will give as full protection. Moreover that if the differences are “qualitative,” a larger mass of weak immunizing units will give as full protection as a given small quantity of more vigorous immunizing units. These theoretical assumptions are doubtless true within certain limits, and safe dosage tables could be worked out for many batches of serum which fall below the requirements now established. But it would be unwise to encourage such a practice. It would put a premium upon poor serum, and cost the swine raisers more for the protection of their herds, since serum is sold by the cubic centimeters instead of by “immunizing units.”

If any condition in the past has justified the sale and distribution of a weak serum, to be used in larger doses than a standard product, or may justify it in the future, there is not, from the professional point of view, any need for a different “dosage table”; it would be preferable to paste a special label on the bottles of the weak batches calling attention to the fact that the serum is weak; and that the dosage should be increased by a certain per cent. This would protect the reputation of the practitioner who might chance to receive serum of low potency, as well as his patron.

Perhaps at some time in the future hog-cholera serum will be sold by “immunizing units” instead of by the cubic centimeter; but for the present every serum producer should strive to make every bottle of serum he puts upon the market conform to the standard official requirements for potency, and either discard, or reinforce and retest all weak serial mixtures. A uniform dosage table for all serum producers might also be an aid to a more uniform product.

I realize that this report is very defective. It falls very short of information which many of you desire. Its faults you may lay upon the Chairman; and whatever good suggestions it may contain, you may credit to my colleagues upon the Committee, and to other members of the Association whose sound and practical suggestions have been communicated to me. I hope the report contains some food for earnest thought, and will lead to wise action which will bring us nearer to the goal, which we as live stock sanitarians should strive for, namely, the extermination of eradicable animal infections.

The reason for these regulations and requirements of inspection is certainly only to protect the community into which the animal goes. If that is true, what is the best protection? It seems to me that the only question that should be in the mind of the man making these regulations should be: What is the best protection to the community in which this animal is to be shipped?

Personally I believe that a sworn statement of the owner of the animal, saying that to his knowledge there has been no cholera on the premises for the past—whatever time in your judgment is necessary—that the animal is in good health, is a good deal better protection to the community into which that animal is shipped than the certificate of the veterinarian.

I have shipped a good many hogs, I have had a good many inspected, I have had a few of inspectors that used thermometers, and I have had certificates handed to me signed, to be used when I needed them. All of us know that these things are done, but the question should be: What is the best protection to the community into which the animal goes?

In my own state of Nebraska, we have this rule. It is not necessary, to get pure-bred hogs shipped into Nebraska, to have a veterinarian's
certificate, but they must be accompanied by the sworn affidavit of the owner.

We want you to give this matter your best thought and best judgment, and if in your opinion it is a reasonable, sensible rule, and will protect the community in which you live, best, then we want you to adopt it.

There is one other thought that I want to bring out in this connection, and that at this particular time, our government has asked us for a 15 per cent increase in hogs. All these little hindrances to the breeders, hold back on the strings a little instead of pushing ahead, and if in your judgment you are protected as you should be in this regulation we are asking for, I assure you, gentlemen, it is going to help just a little bit in putting over the requirements of the nation at this time, and furthering the interests of the war.

Dr. Luckey: Mr. President, it seems to me that we have put ourselves before the breeders of pure-bred hogs in a rather impractical light. I am very glad that Mr. Russell came here today to speak for the breeders, and I hope that we can find a reasonable way to comply with his request, or to simplify the method of controlling hog cholera in the shipment of pure-bred hogs. We are trying an experiment in Missouri about accepting pure-bred hogs, and it has proved to be a perfectly safe proposition. There will be accidental outbreaks of hog cholera doubtless, but not enough to warrant us in exacting inspection of every pig that is shipped into or out of the state. We will know with reasonable certainty that outbreaks of hog cholera do result from these shipments, and for that reason we want a higher standard for hogs which will tend to do away with outbreaks of hog cholera or any other disease, and I think that we can now speak with accuracy on this subject of protection. A breeder of pure-bred hogs can keep his hogs free from cholera, so they will practically spread no infection.

They are shipped largely by express, and are not exposed like hogs in stock cars transferred, switched and delivered through public markets.

It ought to be a religious principle, an absolute question of honor with all breeders not to ship a hog that is diseased; and I believe further that the breeders of registered hogs today have sense enough to quarantine new purchases, to protect their own herds, and I believe we ought to eliminate a lot of these annoyances on interstate inspections. A good many of them are unnecessary.

If we can make rules that look practical to all breeders of pure-bred hogs and gain their respect and support, it will help us a thousand fold in other work that we are trying to carry on. Whatever we can do to gain the good will of any set of men, is highly desirable, and I think we should take the affidavit of the shipper in the case of pure-bred hogs, and cut out all this foolishness.

Dr. Donohue: Mr. Chairman, in the state of Washington our Department of Agriculture has control of the contagious diseases of live stock. We have an agreement with the Live Stock Sanitary Board of the state of Oregon with relation to this matter. We manage this proposition, to the best interests of the swine raisers, I believe, by having permits printed, signed by the state veterinarian of Washington, or the state veterinarian of Oregon, and sending them to each other.

For instance, if a swine raiser in the state of Oregon desires to ship into the state of Washington, he applies to the state veterinarian of Oregon for one of their permits to ship into the state of Washington. If in the opinion of the state veterinarian the herd is not diseased, or
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has not been for the stipulated length of time, this permit is sent to the breeder, who signs an affidavit contained thereon, stating that no cholera has existed within five miles of his premises, or whatever the limit may be, and that stock is being shipped by express, or in cleaned and disinfected cars. This plan has been in operation for two years, and has never given us a bit of trouble to my knowledge, and I know that the swine growers in that district are very well satisfied.

We have got rid of the old style of inspection, and from using cholera treatment or serum where it is not necessary. That is the way we are handling the proposition, and I think we could include the whole United States, and work just as well.

MR. MERCER: Mr. Chairman, with reference to affidavits, and so forth, in 1915 the Kansas requirements did not call for any certificate of health or any requirements whatever for the shipment of pure-bred hogs coming into the state. All over the country, however, where shipments were offered, with few exceptions they were accepted by the transportation companies, and it cost the state of Kansas a considerable amount of money that year to answer telegrams in regard to taking stock without any inspection.

In our last regulation we simply called for a health certificate issued by a qualified sanitary officer of the state, or if they were applied to the live stock commissioner of the state, we will admit them on permits by wire, or however it may be.

I believe that these requirements for the movement of pure-bred hogs in this country are absolutely unnecessary, and in one sense casting a reflection upon the integrity and honesty of the breeders. I would just as soon take the word of a breeder of pure-bred hogs regarding the health of his hogs as I would a health certificate of any sanitary officer in the United States, so what is the necessity of requiring the owner of a hog to make an affidavit as to health, and so forth? To my mind it is foolish. I am not a breeder of pure-bred stock, but I am a feeder, and I have had a lot to do with the sanitation affairs of the state of Kansas, and I know of but one instance of pure-bred hogs being shipped into that state with any bad results.

So these silly requirements that your sanitary officers—and I am one of them—are exacting of the pure-bred breeders in this country, are becoming very obnoxious to breeders and the live stock men of the country; and the sooner we get busy and eliminate these useless requirements, the better standing we will have with the stock raisers of the country, and it will not be necessary for them to enforce laws for us.

DR. DUNPHY: Mr. President, there is no one that has any more respect for the breeders of live stock in the United States than I have, because I believe as a rule they are honest men, men of integrity. But you know there are some that are not up to the standard. You know there were twelve Apostles, supposed to be good and true, but one yielded to the temptation of thirty pieces of silver. Now, that is just the condition of the live stock breeders, and many other commercial men, and I do not except professional men. I was unfortunate enough to be detained in court two or three days as a witness, where a suit was being tried against a live stock breeder, who swore that his hogs were free from hog cholera, and he did not have it on his farm; but at the same time four pure-bred boars shipped from his farm on one particular day were the means of spreading the disease of hog cholera in four different districts in our states. Every one of these four boars
came down with the disease under five days, and pure-bred herds suf-fered from them.

I don't believe that a certificate from the sanitary inspector or the state veterinarian is always going to be a protection, but the affidavit of the owner is going to be a certain amount of protection, provided that inspection is made in the proper way.

A man that will call a veterinarian to inspect a pure-bred hog at an express office—and the inspector is very apt to ask questions about the condition of his herd—if that man will sell a hog from a diseased herd to some other man, he will make an affidavit that it is free from cholera. If he will do business of that sort, he will make a false affidavit. We cannot do too much to protect the breeders along these lines.

Mr. Chairman, a few years ago our southern states, were not very well provided with veterinarians, so that when in Mississippi we decided that we ought to increase our live stock production, it was necessary, in order to encourage the breeders to raise hogs for breeding purposes, to provide shipping regulations. As there are districts in Mississippi where there is not a veterinarian within 50 miles of the live stock breeder, it would be ridiculous for us to exact inspection on a shipment of that kind and expect the veterinarian to make the trip, and so a few years ago, three years ago, to be exact, I got in touch with the adjoining state veterinarians, and proposed this plan to them: That we would have our pure-bred breeders make affidavit to the effect that no hog cholera had existed on their farms within the last six months, having that affidavit made out in triplicate form, having them sent to our office, I would O. K. them all, send one back to the breeder to attach to his bill of lading, send the other one to the state veterinarian of the state into which the shipment was going, so that he would know that that animal was coming into his state, and the triplicate I kept in my possession, so in case we afterward found out that the owner had sworn to a lie, we would have proof against him.

There are a number of those state veterinarians from those adjoining states here today. If hog cholera has been spread from the state of Mississippi into any of these other states, they never reported it to me, and I believe just as Mr. Russell has said, that we should encourage this proposition. If we take into consideration the remarks that Dr. Dorset has made here today, that when inspected, an animal, even though he may be going through the infectious stage of hog cholera, may not show the disease, but may be a carrier of it, even before he shows the symptoms, it is a question when the veterinarian sees a hog and takes his temperature, whether or not that inspection will be an absolute safeguard.

Dr. Reynolds: Mr. President, Mr. Russell comes to us as a representative of the swine breeders, with an important proposition, one that is reasonable, and while I am not prepared to say that it is one we ought to accept exactly, it is an important matter, it comes to us in a very proper way, and I think it is entitled to consideration and some action by this body.

We have had a very considerable discussion of it now, and it is pretty well before us; therefore I move the appointment of a committee of three or five—not larger than five, preferably three—I will make it three—to consider this question, and to bring back a report some time tomorrow, with the further suggestion that Mr. Russell, representing the breeders, be invited to meet with, and talk it over with the committee.
The motion was duly seconded.

PRESIDENT WILLS: Possibly the committee on hog cholera would be willing to attach that to their report. That is merely a suggestion of the chair.

DR. CONNAWAY: I would suggest that some man engaged in the regulatory work be substituted for myself to act with these other men.

DR. REYNOLDS: Mr. Chairman, if that committee cares to take it up, and you think it wise to refer it to that committee, it will cover the point I have in mind perfectly.

MR. GIBSON: Mr. President, I do not believe the committee, of which Dr. Connaway was chairman, if they should act on the matter, would wish to exclude Dr. Connaway. I have been sitting here debating in my own mind whether to debate this proposition under consideration, or to let it go. I have in my mind a picture of the various railroad platforms all over the hog-producing countries. You cannot pass a station where there are no hogs. The subject has been presented at the request of the breeders, and it has been suggested that we might have a better "stand-in" with the breeders if we would suspend the requirements that we may have in various states for the safe transportation of these animals.

I like to be on good terms with the live stock men of my state, and I am pleased to say that I have a great many friends among them, but I have also some enemies. The sanitarian who does his full duty is more apt to have enemies than friends. The fact is that we can scarcely do our duty in Iowa, and please the people with whom we are dealing, but that does not prove that we are wrong.

I could go back and cite to you the history of movements of pure-bred hogs. I have had considerable experience with owners' affidavits, and all I can say is that some of them are good and some of them are worthless. It is an American custom whenever a business or a commercial affidavit is required to make it, whether it be in regard to hogs or something else.

Men have shipped pure-bred boars from their cholera yards and have taken them to fairs, before we had inspection, and have sold them, and distributed hog cholera all over my state, and other states as well. Proper supervision over the pure-bred boars and gilts is the important thing in the control of hog cholera in this country, and if pure-bred boars and gilts become distributors of cholera, all your control work must fall.

I believe that the majority of our swine breeders are in favor of very strict regulations covering hog shipments. The affidavit from an honest man is good with me, but from a dishonest man it is no good. The affidavit of an owner, or the health certificate of a reputable veterinarian, who has not even seen the hog, is another matter, but I am going to look out for the hogs that come into Iowa from any other state.

Mr. Russell is a friend of mine, and he is entitled to great credit. No layman in this western country especially, is entitled to greater credit for his efforts in connection with sanitary work than Mr. Russell, Editor of the "Twentieth Century Farmer." (Applause.) He and that publication have done as much in the interest of true sanitary work in the West as any other agency; but I fear, gentlemen, and I warn Mr. Russell that he may be defending something here today that is not in the interest of the pure-bred swine breeders, and his ambitious farmer who believes in at least keeping a good pure-bred boar. I am not in favor of
throwing down the bars, but I am in favor of receiving animals that give evidence of having been properly immunized against hog cholera.

**Dr. Leech:** One gentleman who spoke on this subject said that he would be willing to take the affidavit of a farmer if that farmer or that shipper would get the railroad company to accept the shipment. The railroad companies will accept anything. A week or ten days ago a car of hogs shipped from another state passed through the division point where I am, with no affidavit, no permit, and a great sign on one side of the car marked, "Exposed to hog cholera," and that sign was put on another division, showing that the railroad company would furnish the car, and pay no attention to the sign.

**Dr. Dyson:** Mr. Chairman, there is one phase of this question that always looks queer to me: Why should the state require a certificate of health on an incoming shipment of pure-bred hogs? For instance, when there is absolutely no restriction against the intrastate movement, it is the general custom when cholera breaks out to get the hogs to the stockyards as quickly as possible; but it certainly looks inconsistent to have all the live stock sanitary regulations open to criticism.

In Illinois we have a law which I think is the best on the statute books of any state in the Union, that prohibits the movement of a cholera-infected hog on the highway or anywhere within the state. It has been on the statute books for fifteen years, I think, and I am the only man in the state of Illinois that was ever indicted under that law, and I did not own the hog either. I was indicted under that law of placing the carcass of a hog into a hermetically sealed container, after the car had been liberally sprayed with a strong antiseptic solution, transporting it over the highway to a shipping station, and shipping that carcass for rendering purposes; but all of the farmers throughout the state had a perfect right to move their cholera hogs whenever they wished, and it certainly seems inconsistent.

**Dr. Haslam:** Mr. Chairman, in regard to the feature of Dr. Dorset's paper in regard to the difficulty of transmitting cholera, or helping to spread it, a couple of years ago I had the pleasure of riding around with some of the government field men a few weeks and getting their opinions pretty thoroughly on what might be the carrier. I found the consensus of opinion among those men was that the household dog was the carrier in a good many instances. On nine farms out of ten the dog roams around the neighborhood, and young pigs are running in and out of the pens and covering the same ground that the dog covers. The dog brings home bones and scraps of meat and buries them, and the pigs root them up, and there you have your cycle.

I would like to ask Dr. Dorset if he had any experiments covering the length of time that the pig contained virus in his system?

**President Wills:** Is there any further discussion?

**Dr. Hoskins:** Mr. President, I would like to ask Dr. Dorset whether he took the daily temperature of the hogs or pigs in his experiments, those which failed to succumb to the virus or infection, and whether the susceptibility of all of these pigs was subsequently shown by inoculation.

One comment that I wished to make on one phase of the report read by Dr. Connaway, I believe he said that as a results of his questionnaire he found that there were some states where the requirements were such that when hogs that had been given the simultaneous treatment, were shipped into the state, they were required to be held seven days. To my mind that is the height of foolishness, I may have
heard wrong, but those of us who have had a chance to observe know that if there is any time when simultaneous vaccinated hogs are liable to be dangerous, it is about the seventh, eighth, ninth or tenth day. In other words, you are shipping these hogs and exposing them to changes of food, water and all sorts of weather, just at the time when they are most likely to be dangerous.

Dr. Connaway: I am sorry to see that Dr. Hoskins and Dr. Dunphy differ on this. In the latter's report to me he says seven days is ample time, but I think that he may not have had some of the opportunities to study this that you have, and was following the regulations of the Federal Department of Agriculture, which I can read to you from this railroad publication. (Dr. Connaway here read B. A. I. Order Number 245.) I think it was the unanimous vote of the Committee that this seven-day period was a rather dangerous limit. Dr. Gibson thought that 30 days would be better than 21, but he is letting them into Iowa in 21 days, but this is the law. Perhaps some of the federal men may be able to explain this.

Dr. Dorset: Dr. Hoskins asked as to the length of time these hogs would remain infected. We have not tested the pigs later than 21 days, but we found them still infected at the end of 21 days. Unfortunately none of the pigs lived longer than that, so we had no opportunity to test the pigs in the late chronic stages of cholera.

The diagnosis of the cases that presented symptoms of pneumonia we have found to be comparatively simple by blood inoculation. Blood inoculation in ordinary pneumonia gives no results, whereas if it is hog cholera, the disease will be transmitted promptly by injection of the blood.

In reply to Dr. Hoskins' question as to the conditions under which the experiments were carried out, as to whether daily temperatures were taken in the pigs exposed—I presume he means those exposed in the infected pens. They were exposed in different ways. The daily temperatures were not taken, except in the case of pigs in pens exposed to infection by material carried on the feet of an attendant who went through the operation of taking the temperature of those healthy pigs. He remained in the pen to afford additional opportunity for exposure. The temperature of the other pigs that survived were not taken, but later when tested, they were all found to be susceptible.

In Dr. Connaway's question in regard to seven days' holding of pigs. The present order of the Bureau—I do not know whether Dr. Kiernan is present or not, or Dr. Mohler—I believe neither of them is here, and I personally have nothing to do with the enforcement of those regulations. They probably would be more familiar with all the circumstances surrounding the issuing of those regulations than I am.

The question of how simultaneously-treated pigs may be shipped, must be considered in connection with the conditions that prevail in this country now, and the necessity, as has been pointed out here today, of conserving the pigs. In many parts of the country the pigs are coming back to the farm and coming back speedily, and it is very important to get them back. Of course, if these pigs were treated simultaneously and held 30 or 60 days, it would be a safer method, but at the same time you would not get any pigs back to the farm. You cannot lose sight of this sad fact. But at the same time every care should be taken to prevent the dissemination of cholera by these shipments, thus defeating the very object you are attempting to accomplish, i. e., to increase the hog supply. You are between two fires, and will
have to weigh both sides and make a decision which will be reasonable and practicable. It is contended by a great many that it is much safer to ship pigs immediately after simultaneous treatment than it is to ship those that are infected with serum alone.

You have heard it stated here today or yesterday by state men that they have supervised during the present season, shipments from one yard of 50,000 hogs treated by the simultaneous method; that the hogs have been followed up, the farms to which the hogs were transported have been visited at regular intervals, and in no single case has an outbreak of cholera followed such shipments.

A MEMBER: How long were they held?

DR. DORSET: They were not held at all. They were shipped immediately after the simultaneous inoculation. If they can be shipped promptly, of course that ought to be done. In giving the simultaneous inoculation, the great danger is that sufficient serum will not be used, and I imagine that the safety that we have experienced in the shipment of this large number of cars after simultaneous inoculation, has been due to the fact that these men stated that they used in all cases just double the dose of serum indicated on the label.

If the label said 30 cubic centimeters for 100 pounds, they gave 60; if it said 20, they gave 40, and in that way safety was assured.

I have for some time advocated the use of ample doses of serum with the simultaneous inoculation. It does not seem to lessen the period of immunity so far as we have been able to determine at all, and it is very desirable to give an excess of serum always.

DR. CAHILL: I would like to ask Dr. Dorset as a practical question, whether the Bureau has any data on the immunization of young pigs. I have been informed from three or four sources that the Bureau has advocated the simultaneous treatment of pigs two or three weeks old, and I would like to know if the Bureau is doing any experimental work along that line.

DR. DORSET: Mr. President, the pigs used in these experiments varied from 30 to 60 pounds. I have not the exact weights here now, but in those limits.

DR. CAHILL: Were they from immune sows?

DR. DORSET: You mean the pigs in our experiments?

DR. CAHILL: Yes.

DR. DORSET: No, of course not. They are very carefully selected, and they were susceptible, all of them that did not come, as was proven later by injection. They were selected from non-immune sows always.

With regard to the simultaneous treatment of young pigs, it has been our practice at Ames to save a lot of the serum tested pigs for later hyper-immunization or use them to produce serum. They are given the simultaneous treatment when they are used in the test. They get 15, 20 or 25 cubic centimeters. It is practically the invariable rule that those pigs later, say six months later or thereabouts, are hyper-immunized by the injection of from 1,000 to 1,500 cubic centimeters of virus into the ear, and invariably they are absolutely immune.

However, it has always been my belief that the small pigs should be successfully treated; that is, that they could be given active immunity that would be lasting by simultaneous inoculation. The idea of danger in treating the young pigs has been that they are so very susceptible that the treatment might not protect them, and disease might get started; in a young pig one would not get immunity, for instance, by a peritoneal injection. I do not know how the idea originated in this country, that a
young pig cannot be immunized. It is pretty true, I think—I do not find any exception to the rule—that young animals of other species—human beings, for instance, are immunized when they are young. We were all vaccinated against smallpox when we were babies, and we retain our immunity quite as well when vaccinated in infancy as when we are adults. I can see no reason for believing that immunity cannot be produced in a young pig, and that is why we are trying that out now, and will have some data on the subject later.

DR. GIBSON: Mr. President, I want to remark on this matter of shipping hogs, that is, stock hogs, and the conservation feature of it, that we have a demand for stock hogs in Iowa such as we have never had during my experience. We are doing all we can to get these hogs to destination, and hoping to make them a safe investment for our feeders. Our farmers are unfortunate in that they have in many instances large quantities of soft, immature corn, and we are endeavoring to get hogs into Iowa to consume that soft corn if we can. We are fearful that our demand will bring to the farmer a worse condition than if he had left the corn to rot in the field, or had burned it up. Many of these hogs that are coming into Iowa have to be fed in transit. They come from Minnesota, Wisconsin and North Dakota in carload lots. We have issued permits, and the permit is based on these restrictions:

"Permission to ship a car of hogs from such a point to such a point in Iowa in a cleaned and disinfected car, fed and watered in transit."

We believe these will be the most satisfactory hogs that will be brought into Iowa for feeding purposes this year. As far as our reports go, they are panning out the best.

One feature of the hog business is the way hogs are moved. When you have a lot of pigs at a certain point, in a certain state that cannot be matured, they must be shipped to the slaughtering centers of the country, where the pork market is made, and they break the market, because they are usually shipped in large quantities. They broke the market this year. The finished pig is at 17 and they are at 14.

We are trying to get hogs as fast as possible, and there is a demand for them. They could be sold in Iowa by the hundred carloads, if we could find them. A lot of these hogs have gone to the yards at St. Paul, where we could not get at them, we could not get them out with a single serum treatment, and the men who are in the serum business up there could not supply the demand. They are doubtless using serum they would not otherwise use themselves in simultaneous treatment.

We have never found hogs vaccinated outside the state as satisfactory as those we vaccinate at the yards in Iowa. We do not want the seven-day stuff, nor the fourteen-day stuff. We would rather take those, that have had the seven-hour simultaneous treatment. As to the serum treatment, I believe that 21-day hogs would be a safer proposition than either 7 or 14-day shipments, but we cannot get them. We would like to have all the pigs we can get that come into St. Paul from the northern country. We could take them all, no matter how many thousands there are of them, because the demand is so great for these pigs in Iowa.

We have secured some hogs that were shipped from St. Paul to Sioux City, Mason City, Cedar Rapids and Ottumwa, and then we gave permits from those points within our state to destinations, and then vaccinated at destination. That is warping the regulations, and it is not right, but we are doing it from necessity. I believe that there
ought to be an easing of regulations until this demand for increased production is met, and I have thought that a recommendation here along those lines might be suggested to the Resolutions Committee.

Mr. Mercer: Since last January we have had shipped out of the Wichita market and the Kansas City market, about 205,000 head of hogs in the state of Kansas. Out of that number of shipments, seven herds bore a loss to exceed ten per cent in outbreaks of cholera; less than 15 per cent showed a loss to exceed 5 per cent; and less than 20 per cent of the entire number of shipments showed no loss whatever from cholera.

Our rule is that hogs can be vaccinated today with our methods and shipped in disinfected cars, taken to the farm, and held in quarantine for a period of fifteen days. Those are absolute records and they are obtained accurately. Like Dr. Gibson, we have been trying to persuade the Bureau of Animal Industry to eliminate the requirements of the seven-days' holding of hogs at public yards.

The reason we ask this is because of the condition of the Kansas City stockyards—the stockyards at Kansas City are all in Kansas, but there is only one line of railroad that runs entirely in Kansas; therefore, when they go out over the other roads, it makes an interstate movement, and the hogs cannot be moved except by paying a large switching charge or holding seven days. Furthermore, many hogs are shipped from Oklahoma City and Fort Worth, and the rule has been to ship hogs from Fort Worth and Oklahoma City to Wichita for immediate slaughter.

I believe that this is a matter of very great importance, and that we ought to get these light hogs, such as Dr. Gibson speaks of, from these central markets. I believe that it is safe enough to take a chance; in fact, I know it is worth while to get these hogs out to the feeding lots and feed them this soft corn and other feed.

President Wills: The time is getting short, is there any further discussion? The question now as I understand it is, whether we shall accept the report of the Committee on Hog Cholera, with the added suggestion that the committee consider further and report later on the question of accepting or adopting an affidavit from a pure-bred owner as evidence of health. Is that stated correctly according to Dr. Connaway's understanding, Chairman of the Committee?

Dr. Connaway: I think the members would prefer a special committee. I know I would.

President Wills: Then the withdrawal of that motion and acting on the report of the Committee, would be the proper parliamentary procedure.

The motion was withdrawn by the gentleman who offered it, and his second.

President Wills: We are now considering the acceptance of the report of the Committee on Hog Cholera. Is there any discussion?

The report was unanimously adopted.

Dr. Reynolds: Mr. Chairman, I would like to make a motion that the chair appoint a committee of five to consider the request of the swine breeders presented by Mr. Russell, with the understanding that Mr. Russell be invited by that committee to sit with them.

The motion was duly seconded and carried.

President Wills: I will have to ask to be excused from appointing that committee immediately. I will notify the various members as soon as I have time to select them. We will now have the report of
the Committee on Diseases, of which Dr. Kinsley is chairman, or temporary chairman, rather.

Dr. Kinsley: Unfortunately Dr. Reichel, our chairman, was detained, but some six or eight months ago he wrote each member of the committee, asking their opinion relative to what should be brought up at this time. I know of at least three members that reported back to Dr. Reichel, but I presume in the rush of war orders he has been unable to further this work.

You are all aware of the fact that the committee on diseases is practically functionless. They take the scrapings, so to speak.

We have had a committee on glanders, a committee on tuberculosis, a committee on abortion, a committee on hog cholera, a committee on tick eradication, and usually at these annual gatherings there are excellent papers on a list of subjects such as necrobacillosis, blackleg, and other diseases that concern us, and the members of the committee present have wondered what you would expect us to report.

Generally it is the opinion of the remnant of the Committee on Diseases that they are practically extinct, and that the committee itself, as a standing committee, should be eliminated, as there is nothing left to report.

I just want to say that the state officials and the officials of the transportation companies should welcome the recent introduction of the Department of Agriculture, or of the Bureau of Animal Industry, of some regulations concerning the shipment of horses. At this meeting thus far I do not believe we have mentioned horses. They are attempting a splendid work just in the beginning of it, and I believe much can be expected.

In the central part of the United States just at the present time, the thing which concerns us most is that dietary disturbances in horses are sure to result from the feeding of immature or soft corn. This has caused considerable trouble, and we also have the so-called cornstalk disease.

This report is largely personal, although I have seen two other members of the committee that are present, and I hope that you will accept the recommendation and eliminate this committee from the list.

On motion duly seconded and carried, the report of the committee on diseases was accepted.

President Wills: I have a communication which it seems to me very proper to present at this time. It reads as follows:

The United States Live Stock Sanitary Association, while in session at its Twenty-first Annual Meeting, was shocked to learn of the sudden demise of one of its most ardent members, Dr. Robert H. Treacy, Bismarck, N. D., who was taken seriously ill while en route to the meeting, and died at the Marine Hospital, Chicago, at 4 p. m., December 3.

Resolved, That the Secretary convey by telegraph the heartfelt sympathy of the Association to Mrs. Treacy and her children in this the hour of their bereavement.

On motion duly seconded and carried, the resolution was adopted by a rising vote.

The convention adjourned to Wednesday, December 5, 1917.
TWENTY-FIRST ANNUAL REPORT

FIFTH SESSION.

December 5, 1917, at 10 o'clock a. m.

PRESIDENT WILLS: We have been asked as an Association to hear a committee from the National Livestock Exchange, who will have a representative here to present questions in relation to uniform regulations and kindred subjects. They will appear after the morning program. It is a matter that intimately concerns the Association, and it seems proper to have it presented, inasmuch as they have asked that that courtesy be extended to them. They will be here some time after this program.

The first paper this morning is on the important subject of "Blackleg and Its Prevention," by G. A. Johnson, of Sioux City.

DR. JOHNSON: Gentlemen, the paper which I will offer for your consideration this morning is rather a field report, and does not take up the scientific end of the question to any extent. By reason of the advance in the methods of treating blackleg, I take it for granted that you practically all know what blackleg is and are able to diagnose it, so that it will not be necessary for me to enter into any of the pathological questions.

BLACKLEG AND ITS PREVENTION.

By Dr. G. A. Johnson, Sioux City, Iowa.

Blackleg is an acute infectious disease of cattle, known under a number of various names. While other ruminants are not immune to the disease, it is not common among them.

Some authors state that swine sometimes suffer from blackleg, but we are inclined to believe this a mistake in diagnosis, and that the supposed cases of blackleg in swine are some other form of emphysematosa, as there are several other conditions that are caused by other gas-forming bacilli that more or less closely resemble true blackleg.

This opinion is based largely upon the fact that it is quite a common practice among farmers of many localities of this country to feed the carcasses of animals that have died of blackleg to their swine without producing a single case of blackleg in the swine, so far as we have been able to learn.

Blackleg and anthrax were considered one and the same disease until Bollinger (in 1875), and Feser (in 1876), demonstrated that they were two separate and distinct diseases.

Shortly after this the causative agent, bacillus chauveaui, was closely studied and an attenuated virus vaccine produced, that was capable of producing more or less immunity in susceptible animals, and under more or less modified processes, large quantities of these vaccines have been produced and used since that time.

That these vaccines were of more or less merit and filled an important field is attested by the millions of doses that have been
used. In fact they were the best and only remedy of merit on the market until recently. But, as is always the case with attenuated viruses, the results have not always been all that could be desired, especially of late years when the available ranges and pastures have been more or less over-crowded with stock, causing increased exposure and prevalence of the disease.

To give you an authoritative statement of these results, permit us to quote from an article that appeared in the Feb. 7, 1917, issue of the Kansas State College publication by Professor F. S. Schoenleber, at that time head of the veterinary department of that institution, in which he states:

In the spring of 1905, when I took charge of the veterinary department, I found that the department was sending to cattle raisers several hundred thousand doses of blackleg vaccine annually. At that time occasional reports would come to the office complaining of the inefficiency of the vaccine. Upon investigation it was found that at times the vaccine killed a certain percentage of the calves vaccinated, while at others it did not protect them for any length of time. Further investigation showed that all the blackleg vaccine used, no matter from what source, acted in the same way.

From year to year these complaints increased in number. Some cattle raisers complained that they vaccinated three, four and even five times, and still lost calves, the losses running up in some cases, to more than 10 per cent.

The conditions prompted the department to look into the situation critically and see what could be done. In 1912 the work of analyzing and testing vaccine of the different makes was begun. It was shown that no vaccine was of a standard strength and that no two samples were exactly alike.

Having proved all blackleg vaccine inefficient, we were then up against another problem: The question of some hyperimmune serum, or serum and virus, naturally presented itself and, accordingly, investigations were directed toward that end. Dr. T. P. Haslam and Dr. O. M. Franklin were detailed to prosecute the work.

After years of experimentation a serum was perfected which has never failed to prevent the spread of the disease, and in some instances has cured animals apparently beginning to show signs of the disease. A few well-advanced cases have been cured with special treatment with large doses of serum. During the experimental work with this serum, a germ-free vaccine was discovered that has given excellent results. Doses of five cubic centimeters have produced in calves six months of age, or older, sufficient immunity to protect them from blackleg the remainder of their susceptible period. No losses have occurred in vaccinated herds except that occasionally a calf succumbed within 12 to 24 hours after the treatment. These calves were doubtless affected with blackleg, in the incubation period, when vaccinated. Such losses are to be expected after vaccination with any agent not producing a passive immunity.

**Germ-Free Blackleg Vaccine.**

The germ-free blackleg vaccine is an aggressin. Briefly, it is prepared as follows: Supposedly susceptible calves are inoculated
with a virulent strain of pure blackleg virus and the disease allowed to run its natural course. The carcasses of such animals that die within forty-eight hours after inoculation are taken into the laboratory, properly prepared and inspected and, if found free from harmful diseases, the blackleg-diseased tissues are removed, and the serum and juices from these diseased parts are collected and purified by filtrating, etc., so as to render the finished product absolutely sterile. The fact that the animal dies of blackleg within forty-eight hours after inoculation indicates that large quantities of toxins and antigens are produced.

In order to assure its sterility, each serial lot is thoroughly tested by three separate and distinct processes: The fermentation tube test, the culture media test and the guinea-pig test. These tests are carried out according to the regulations prescribed by the Bureau of Animal Industry.

The product must stand each of these tests perfectly before it is offered for sale. It should also be tested on guinea pigs or calves for potency. Thus we have in the germ-free vaccine an absolutely sterile product that contains all the products of virulent blackleg bacillus, generated in the natural way. It is harmless, even in quantities twenty or more times the size of the regular dose. The animal requires handling but once. It may be used on any sized or aged animal and under varied conditions, such as at time of branding, dehorning, castrating, etc. It will produce a lasting if not a permanent, immunity. However, it requires from three to eight days to produce its full immunizing effect, during which time the animal may contract the disease.

More recently an artificial aggressin has been put on the market under the name of "Blackleg filtrate." It is prepared by growing the blackleg bacilli on artificial media in the laboratory, and purifying by filtration, etc., but as this product is still in the experimental stage and some inoculation tests and field reports do not fully bear out the claims put forward for it, we prefer to reserve judgment pending more definite information.

Blackleg serum is produced by hyper-immunizing horses by repeated injections of increasing doses of virulent blackleg virus. After hyper-immunization is complete, the blood is drawn, filtered, etc., and, after being tested for purity and potency, is ready for use.

This serum has more or less curative value when used in the early stages of the disease, but the very nature of blackleg precludes successful medication in most cases, hence it is not advisable to build false hopes about a cure. Better play "safety first" and vaccinate with the germ-free vaccine before the herd becomes infected.

This serum is also used in conjunction with blackleg virus to
produce immunity, but this does not appear advisable for three reasons:

1. It does not produce as lasting immunity as does the germ-free vaccine.

2. It is much more expensive and requires handling the animal twice.

3. Virus should never be used unless necessary, because of the danger of not only producing an occasional death, but also of contaminating the premises, and thereby increasing infection and perhaps creating new centers of infection.

On the other hand, blackleg serum has a place in a limited field, i.e., where a virulent type of blackleg has broken out in a herd of valuable cattle.

Then it is advisable to give a large protective dose (30 to 60 cc.) of serum; this should check further development of the disease within the herd, or render such animals as might develop the disease within 24 to 48 hours after treatment, more amenable to curative serum treatment. Then follow this protective dose of serum in about fifteen days by giving a regular dose (5 cc.) of germ-free blackleg vaccine. The reasons for making the injection of the germ-free vaccine approximately fifteen days after administering the serum may be briefly stated as follows:

The serum and germ-free vaccine are antagonistic, the one counteracting the other; hence, if the vaccine is given before the serum has been largely eliminated (which apparently takes about 15 days), the one will counteract the other. On the other hand, if we wait too long after the effect of the serum has passed away, the disease may develop again. By this method the spread of the disease within the herd should be checked, and a lasting immunity produced with a minimum loss of animals, and absolutely no danger of spreading or producing disease. A still better method, where conditions are favorable, is to take the temperature of all animals at the time of treatment and such as show a temperature of 104°F., or better, should be given a much larger dose, from 100 to 300 cc. according to indications. This method has been followed in several instances with very gratifying results. But it can be seen that it is rather expensive to be used in ordinary herds and can be followed only where conditions are reasonably favorable for handling the animals.

Another method of handling a herd already affected with blackleg is to administer the germ-free vaccine in regular sized dosage, and keep a very close watch of the herd for about ten days, and should any of the animals present any symptoms of blackleg, immediately administer a curative dose (300 to 500 cc.) of serum. This is not so certain but may be cheaper than the first mentioned method.
In attempting to produce immunity by means of an attenuated virus, a materially different biological principle is involved than that involved where a germ-free vaccine is used.

Where an attenuated virus is used (it makes no difference whether it be blackleg, anthrax, smallpox, or whatever disease) it is supposed to produce a mild or modified form of the disease, which stimulates the production of antibodies in the host. This involves a number of vital points, the two most important of which are the proper attenuation of the virus, and the proper condition of the individual to be treated.

Regarding the virus, if it is too attenuated, it will produce no reaction (disease) whereas, if it is not attenuated sufficiently it may produce so violent a reaction as to prove fatal.

Regarding the condition of the animal—if its resistance to the disease should be very low, it would suffer a strong reaction which might prove fatal, or if its resistance should be very high, the animal would suffer little or no reaction and hence acquire little or no immunity. But, should the attenuation be just right and the animal in the proper condition, then the proper reaction or degree of disease will take place and more or less immunity be acquired. But being hedged in by so many uncontrollable factors, it is strange that there are not more failures. Another fact that should never be lost sight of is that every time any virus vaccine is used, the virus of the disease in question is being introduced on the premises, and, until we know much more about biology, we have no assurance that it may not result in harm. In other words it should be considered dangerous. But when the germ-free, or sterile vaccine is properly administered, there is absolutely no danger of conveying any disease. The theory upon which germ-free vaccine produces immunity is that the antigens contained therein stimulate the production of antibodies in the individual, or, in other words, it is the products of the germs that stimulate the production of the antibodies.

Administering: The most essential points to be observed in administering germ-free vaccine is cleanliness. Have clean, sterile syringes and needles, draw the vaccine direct from the container into the syringe, as there is always danger of contamination where it is turned from the original into any kind of container, and then draw into the syringe. Disinfect the seat of injection with some good agent, as tincture of iodin.

Intramuscular injections of germ-free vaccine insure a little quicker absorption, but are more painful, and upon the whole have little or no advantage over subcutaneous injections.

Blackleg serum should be injected intramuscularly, especially in cases where there is any localized swelling, when it should be injected in and about the swelling not to exceed 30 cc. in one
place. Some have advocated intravenous injection, but as the serum is from a different species of animals it would appear dangerous.

The following data obtained from the owners of the cattle, indicate the results that are being obtained with germ-free blackleg vaccine:

<table>
<thead>
<tr>
<th>No. Herds</th>
<th>No. Head</th>
<th>Year Vaccinated</th>
<th>No. Died of Blackleg since Vaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>1,387</td>
<td>1915</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>3,320</td>
<td>1916</td>
<td>0</td>
</tr>
<tr>
<td>....</td>
<td>25,000</td>
<td>1917</td>
<td>5</td>
</tr>
</tbody>
</table>

Thus it will be seen that as far back as we have any data, the animals retain their immunity, after one treatment.

The most remarkable fact is that out of the several hundred thousand doses of the germ-free blackleg vaccine that has been used this year, not a single animal has been reported lost from blackleg later than eight days after vaccination and but a very small fraction of 1 per cent during the first eight days after vaccination, and all such losses occurred in herds where there had been losses from blackleg previous to the herd being vaccinated with the germ-free blackleg vaccine, or, in other words, in infected herds.

PRESIDENT WILLS: Our program provides for discussion at the end of the session. Possibly it would be more satisfactory if we discussed each of these papers as they are presented. Is there any objection to changing our method and doing that? If not, we will open this paper for discussion now.

DR. HIMMELBERGER: Mr. President, I would like to say something regarding the remarks brought out in Dr. Johnson's paper. Dr. Johnson is connected with a concern that manufacturers hog-cholera serum and hog-cholera virus. He objects seriously to bringing onto the premises an attenuated virus and thereby subjecting those premises to infection. On the other hand, he does not object in the least to subjecting a farm to infection from hog-cholera virus. The inconsistency is hardly compatible.

DR. HASLAM: Mr. Chairman, Dr. Johnson seems to be very frank in admitting that he has infected farms with hog cholera.

DR. KINSLEY: I would consider it more serious to have infected a farm with blackleg than hog cholera from the remarks we have had as to the longevity of the two.

MR. GOEBEL: We have had quite a number of calves at the Kansas State Agricultural College with which to make this particular vaccine to which reference has been made, and our calves are infected with virus. Part of them die, part of them do not. Most of them do not die, and develop beautiful lesions and abscesses and discharge pus which contains blackleg organisms. We buy calves 15, 20 and 25 at a time, and turn them into the lots where the other calves have been running, and thus far we have failed to develop any susceptible calves among them.

DR. PEARSON: Mr. President, I wish that Dr. Johnson would say
something for our benefit as to how he secures his animals. Over in my country I can find calves, but they are all innocent things, and I wish he would tell me the story so that I could go out and treat calves as he does.

**DR. JOHNSON:** Mr. President, in answer to the first criticism in regard to virus, I stated in my paper, I believe, that I did not think it advisable to use virus unless necessary. If it were possible to produce a product—which I anticipate some time in the future will be produced—if we could immunize hogs without the use of virus, I certainly would be in favor of it. I am in favor of using serum virus at present, because that is the only method of producing permanent immunity.

In regard to Dr. Pearson's question about finding calves, we do not have any serious trouble with that out in the west here. If it is in a farming country, you make a squeeze and get your calf, and then you can give him the injection. It is a matter of taste with the operator whether to make the injection in the neck or in the shoulder or some other place. Where there are a number of animals a chute is preferable. You can get the animals in a corral and run them into a chute. Does that answer your question?

**DR. PEARSON:** Yes.

**DR. EICHHORN:** Mr. President, in regard to the remarks of Dr. Johnson, in which he states that a farmer goes out and purchases a few doses of blackleg vaccine, I do not believe that all the vaccine so purchased in the United States amounts to nearly as much as the Government furnishes free of charge, so if the disease is spread, of course, the Government is a party to it.

I was very much interested in the paper presented by Dr. Johnson. As I have devoted considerable time during my association with the Bureau of Animal Industry to the study of blackleg, I am very much interested in it, particularly in regard to the newer products, which are now being exploited and employed for the treatment of blackleg.

In Dr. Johnson's paper I noticed that he spoke at first of aggressins. Later on he says that the fact that calves die within four to six hours shows that the animals have been saturated, practically, with naturally produced toxins.

Now, aggressins and toxins are two different things entirely. We have to deal with either one or the other, and I think it is essential in using any product, that we should know everything possible about the specific action of both products, whether we have to deal with one or the other.

As far as the natural production of these substances is concerned, we have absolute evidence that they are present in animals which die, and as a matter of fact, investigations have proven conclusively that it is not blackleg organisms which kill the animals, but that some specific toxins are responsible for the deaths. These toxins no doubt develop during the course of the disease to various extents and degrees, but these naturally developed toxins as a consequence of the infection or disease, are not always of equal virulence or extent in different animals. Some animals, of course, having higher susceptibility, will develop a lesser amount of toxin and die, perhaps with a less virulent form of the disease.

On the other hand, in other instances where the resistance of the animals is greater, it is natural that the disease will progress to a greater extent as the toxin develops in a greater amount.

In regard to blackleg filtrates which he mentions in his paper, this is
also a product prepared from the blackleg organisms in different media, the toxins being developed in the greatest virulence possible, so that they will produce the maximum effect when used for immunization purposes.

The work which has been conducted by the Rockefeller Institute in this connection, reported in a series of articles, established with regard to the gas gangrene organisms, of which we have a group, such as blackleg virus, blackleg organisms, and to some extent also malignant edema organisms, under certain conditions all produce toxins, which, when injected into the animal in sufficient amount, will produce the classical form of the disease, minus the organisms and pathological changes which are the direct result of the organisms, but there are lesions and other manifestations which are very nearly identical with those of the original disease.

In the production of these toxins, they can be controlled quite rapidly, when properly cultivated. However, it requires a certain amount of meat in the media for the organisms to act upon in order to produce the most potent toxins. The breed of Holsteins were selected as the type, in order to get the best results, but when properly taken, it is possible to develop toxins to the highest degree and carefully observe them throughout the process, so that when the product is finished we can be assured that it is effective in its action. Immunization is of course what we are trying to secure, and for the purpose of immunization we must work toward producing protective substances. That is the whole thing, whether it be the natural product or the artificial which is prepared in the laboratory. The toxins, of course, are the same. They must be the same. The organisms cannot work any differently in one than in the other.

I noticed that Dr. Johnson also mentioned that the serum be given subcutaneously. I do not agree with him that intravenous injection of a serum obtained from an animal is dangerous, and it is not proved in the different products which are being applied now for the cure and prevention of human and animal disease. Take, for instance, pneumonia serum. It is injected into human beings intravenously without the least danger, so I believe the best results are obtained when the serum in an active case is administered intravenously, and I think that a demonstration of that point, especially in blackleg, is very apropos, since there we want immediate action, and the quickest results are obtained by intravenous injection always.

I think a few words on the product, so far as priority is concerned, would be in place. I think you will find that fifteen or twenty years ago, investigators carried out experiments in this particular and proved it, and therefore I think it is nothing more than right to give them credit, and we should not disregard the work of others who are deserving of credit. Bylle of Prague deserves great credit for his work, and I think you will see it has been finished in its entirety if you will look up the subject.

DR. HASLAM: I will say I have been connected with blackleg researches since 1914, and that I am still carrying on blackleg research, probably more intensively and with better facilities than were ever before at my command. Data is accumulating rapidly, and points that were formerly mooted, are beginning to clear up, in a manner, and I would much prefer to quote no data at this time, because of this much I am certain, that conclusions drawn from experiments on a limited number of guinea pigs are absolutely erroneous. A superficial view of the question would indicate that the guinea pigs acted very irregularly in regard to immunization with blackleg. Our experiments have included
about 200 guinea pigs, and upon a majority of those we have after ten
days injected a dose of virus. When you study a large series of animals,
such as that provides, you find a remarkable unanimity.

I have purchased a considerable amount of blackleg filtrate on the
market. My series of animals includes only 80, about half of which
for some reason or other failed to survive the treatment with the
filtrate, and I do not feel that I am justified in presenting the figures
before this association that are based on immunity tests of 40 guinea
pigs, because the results were not uniform.

I inferred from the published statement that the treatment of a
series of guinea pigs with one-tenth or two-tenths or four-tenths of a
c. c. of concentrated product should be sufficient. Inasmuch as it was
stated that half of c. c. of suspension blackleg meat was given, and
that suspension consisted of approximately one-half meat and one-half
solution, and any blackleg virus will kill a guinea pig in a dose of about
two and a half milligrams, if a half c. c. consisted of one-half meat
and one-half liquid, it would contain about 250 milligrams, and I think
there is some discrepancy or misunderstanding.

There is just one point that has been brought up, which I cannot
let stand without some protest. As far as I am aware no evidence
has been published or adduced to show that the product obtained with
culture media is identical with that obtained from the calf inoculated
with blackleg. I do not get the same results from calves or from
guinea pigs. I have thoroughly reviewed the published work of Dr.
Nitta of Japan, and I do not think that he has in any way demonstrated
the identity of the two products. You know the formation of aggressin
probably depends upon the life of the organism, so I do not believe
that the two products are the same. I have seen no experiments which
indicated that they are the same. My idea is that the blackleg filtrates
should stand on their own merits, and not upon any fancied or alleged
analysis with the other products. (Applause.)

DR. EICHHORN: Mr. President, I fully agree with Dr. Haslam. I
would like to know, however, what are the active principles in one
and the other, and furthermore, I agree with his contention as to
the guinea-pig test which he referred to. I believe that such tests
are not accurate, as he also intimated; but I think it is of great im-
portance to determine just what the active principle in these products
is, if any.

MR. FELKER: Mr. Chairman, I am intensely interested in this dis-
cussion, but looking at it from the layman's standpoint, I feel that
when doctors disagree we poor fellows who are not scientists and pro-
fessional men ought to beware.

I am wondering how many states represented here have regulatory
laws controlling the distribution of these products, which some of you
say are exceedingly dangerous, and which I have been led to believe,
and others say are not so dangerous. I am emphasizing this point
because in my state I have no authority to control the sale of hog-
cholera virus, blackleg vaccine and tuberculin, and I am asking our
attorney-general if our law is sufficiently elastic for him to render
an opinion which will give me that right. With this war crush that
is now on, and which we are trying to fight through to a finish suc-
cessfully, and which we will, drastic measures are being used in our
state to encourage attention among our farmers as to the care and
preservation of their stock and their flocks, and I find that there is
a movement among some of the agents doing extension work in New
Hampshire, to instruct the farmers how to use this very product which
we are talking about here, also hog-cholera virus. It is rather critical to me, because I believe that it ought to be in the hands of licensed graduated qualified veterinarians, and nowhere else.

If it is possible for this association to go on record here at this meeting, to the effect that we are behind a proposition which will control the sale and distribution of these products, I believe we will take a long step. I am looking at the question as a sanitary official of my state, not as a professional man. It was stated in your convention one year ago by a New England representative, that 30 per cent of the cattle of that district were tubercular. That will not hold good in New England. We have some tubercular cattle, but that is too strong an indictment of the animal industry of New England.

I do not believe that tuberculin should be used promiscuously and sold promiscuously to all druggists, in turn to be sold to any farmer, or cow man, or trader or dealer, and then have the same thing happen, as has happened in the few instances which have come to our attention recently, where an honest, reliable Godly man, in the profession which you men represent, a good veterinarian, upon being called to a certain place to make a test, found several bottles which had formerly contained tuberculin thrown around outside.

Is there not some way, gentlemen, that the association can use its influence, either by resolution or some other way to prevent these dangerous products from being sold and distributed to anybody and everybody who may apply, as is being done in my part of the country? I wish you would consider this phase of it for a moment, and see if this association cannot help New Hampshire out.

PRESIDENT WILLS: I might say for the information of Mr. Felker and others that I think three or four years ago this association went on record in reference to the control of these products, in substantially the same way Mr. Felker has suggested. It was passed as a resolution by this association.

DR. HENDERSON: Years ago, Mr. President, the Bureau took up the treatment of contagious diseases by the use of serum but we heard nothing as to the use of medicine in connection with it. I had a case, a pure case of tetanus, from my town, in a young man who contracted the disease and was treated at one of the near-by hospitals, and he was given antitoxin, in connection with medical treatment. The various bowel and nerve troubles which developed were handled through the use of medicine. In all of these discussions I hear nothing in regard to medicine. It seems to me it would be well to use some light form of antiseptic in treating a good many diseases. When this terrible disease broke out at Galesville, I had a relative who contracted the disease. The disease is not understood, the germ is not known and the treatment is not known. The patients seemed to strangle almost to death; gargles seemed to relieve them. The woman and the daughter who were afflicted are still living. In these various troubles which we speak of treating with serum, would it not be well to use medicine sometimes in connection with the serum? In the treatment of hog cholera would it not be well to use some bowel antiseptic, so that the liver would be in proper shape and antiseptic. In inspecting a hospital a year ago, I noticed that the successful doctors were the ones that were ready for anything that might come up.

DR. JOHNSON: Mr. President, I would like to ask Dr. Eichhorn if he is in favor of the intravenous injection of serum as a curative agent. Our experience, I will admit, is limited, but we figure that blackleg when once developed is practically, so far as the disease producing con-
dition is concerned, a local disease. If it does produce systemic effects through toxins and other products, they are absorbed, but in the treatment of these cases we have had better results by making our injections into the diseased parts, thus coming in direct contact with the germs, and another portion of the dose should be injected into healthy tissue, preferably surrounding the local infection, and there absorbed to produce systemic effect. This is simply a personal matter with various schools, as to the treatment, but I am simply giving you the results of our observation, the results that we have had in the field.

Mr. President, we have in Minnesota a very strong statute which attempts to restrict the dissemination and use of any living virus within the state. The Minnesota law, for instance, forbids the sale, giving away, or other distribution or use of hog cholera virus or any similar virus of a similar disease except upon a written permit from the state live stock sanitary board. The point I wish to call to the attention of our commercial brethren here, is that they are constantly violating the spirit of our law, but perhaps not the letter of it, when they send hog-cholera virus into our state or any other such state. Our attorney-general, and I believe any good attorney-general, would render an opinion that we cannot forbid the entrance of such things into the state. We can keep a sick hog with cholera, but we cannot forbid the entrance of hog-cholera virus, but we can define what shall or shall not be done with it after it gets into the state. The spirit of our law, and the spirit of similar laws elsewhere is against the unofficial distribution or use of any such virus, and yet our commercial brethren are sending virus into these states, in direct opposition to the spirit of law.

We would like to have their co-operation, we would like to have their help, but we do not feel in Minnesota that the unrestricted use of hog-cholera virus is at all necessary, and we want to ask our commercial brethren to abide by the spirit of our law.

If there is no further discussion, the Committee of the National Live Stock Exchange is here, and I am happy to extend to them on behalf of the Association the courtesies of the floor.

REPORT OF COMMITTEE OF THE NATIONAL LIVE STOCK EXCHANGE.

Mr. Burnett: Mr. President and members of the United States Live Stock Sanitary Association: I appreciate the opportunity you have given me to come before you, and I come on a mission from the Executive Committee of the National Live Stock Exchange. In this time of war the live stock industry has been called upon by the Federal Government to increase production, and I come to you with a resolution adopted by the National Live Stock Exchange, which we hope will be given due consideration:

Whereas, The members of the Executive Committee of the National Live Stock Exchange recognize the urgent need of increased production of food animals and that this increased production can be best accomplished by the shipment of immature and unfinished cattle, swine and sheep from markets where they have been received with other animals in condition for slaughter, and

Whereas, The shipment of live stock from such market points to pastures and food lots is subjected to various rules and regulations imposed by statutes or by orders of the several State and Federal Boards acting under authority conferred by law, and

Whereas, Such laws, rules and regulations are deemed essential to the proper protection of public health and the prevention of contagion in herds, droves and flocks of healthy animals so that their enforcement is necessary and proper, and

Whereas, The present conflicting laws, rules and regulations promulgated by law or order unnecessarily hamper and restrict the distribution of food animals which
should be further matured and fattened, and thus prevent the full use of available feed stuffs which should be used to increase the meat and meat products supply of ourselves and our Allies, and

WHEREAS, The National Live Stock Exchange believes that the multitude of laws, rules and regulations might, without in any way endangering public health or the safety of healthy food animals, be merged into a system of uniform regulations applicable throughout the several states and the District of Columbia; therefore be it

Resolved, That a committee be appointed to confer with the United States Live Stock Sanitary Association during its convention to be held in Chicago December 3, 4 and 5, 1917, and to respectfully urge that association to appoint a similar committee to confer with the National Live Stock Exchange committee to arrive at a mutually satisfactory set of regulations for use throughout the country during the period of war, for the specific purpose of meeting the exigencies of the war period.

Now, gentlemen, we do not mean by this that all rules and regulations should be laid aside, or anything of that kind, but as a matter of concrete example, the majority of our state boundaries are purely imaginary lines, and yet cattle going to the market from one state are subject to certain procedures, and another state requires other procedures, and we have different state inspectors. For instance, in East St. Louis shipments going into Missouri, an inspector has to come over from St. Louis, and he will come over only for a certain number of animals, and all that sort of proposition. We believe that a good deal of good can be accomplished if you gentlemen will take up this matter and appoint a committee, we feel that it is a question of getting together, and that is all there is to it. I thank you very much for the opportunity of appearing before you.

Dr. Turner: Mr. President, I move that this be referred to the Resolutions Committee.

The motion was duly seconded and carried.

Dr. Connaway: Mr. Chairman, I move that the president be directed to appoint a committee to confer with the committee from the association mentioned to consider these matters in addition.

President Wills: The Resolution Committee, Dr. Connaway, I assume, from that motion—Dr. Turner, would that carry with it an understanding that they would confer with the Committee of the Live Stock Exchange; is that your idea?

Dr. Turner: That is the idea.

Dr. Connaway: As a matter of information then I would like to know the composition of that committee. It ought to have Federal men on it. The Resolutions Committee might not be composed of men who would give the best service. I think that the president ought to consider the composition of that Committee very carefully. We have been talking about uniformity here, and it seems to me this is a good time to get together with the people from the other side.

President Wills: The Committee on Resolutions, Dr. Connaway, comprises Drs. Dyson, Dunphy and Munce.

Dr. Connaway: No federal man?

President Wills: No.

Dr. Gibson: It is understood that the Resolutions Committee will deal with this matter in their report to this convention during this session.

President Wills: It is to report at this meeting.

Dr. Gibson: We can deal with their report on the matter when they present it.

Dr. Connaway: With that understanding I withdraw my motion.

President Wills: The next on the program was a special report from the Committee on Tentative Plan for Accredited herds. Mr. Mercer is very anxious to get away, and if there is no objection, we will have his paper first, "Cleaning and Disinfection of Stock Cars," by J. H. Mercer, president of the National Live Stock Shippers' Association.
CLEANING AND DISINFECTION OF STOCK CARS.

By J. H. Mercer, Kansas.

President National Live Stock Shippers Protective League.

I am very glad indeed of the privilege of speaking before this body on the subject of cleaning and disinfecting of live stock cars. I am also very glad to give my hearty endorsement to the resolution which was just read by the representative of the National Live Stock Exchange. I think it very necessary that this body of sanitary officers, both federal and state, come to some sort of an understanding as to uniform requirements for movement of live stock, on account of present existing conditions of the food question in our country.

The cleaning and disinfecting of cars will not require any great length of time to discuss. The cleaning and disinfecting of cars, in compliance with the law and regulations has been in force for a long time. This requirement, however, applies in a regular way to live stock cars hauling southern Texas cattle, or rather cattle from the tick-infected area of the United States. I think it was sometime in 1884 when the rule calling for the cleaning and disinfecting of cars hauling southern cattle, went into effect, and from that time down to 1915, the railroads hauling cattle from southern territory, absorbed all charges for cleaning and disinfecting.

In February, 1915, after the foot and mouth disease had prevailed in this country for several months, the federal government issued an order requiring the cleaning and disinfecting of all live stock cars. This order applied to a very large section of our country, and before the shippers of the country realized what was going on, the carriers had secured a right from the Interstate Commerce Commission to embody in their tariff a charge of $2.50 for single deck cars, and $4.00 for double deck cars.

The reasonableness or unreasonableness of this charge I am not going to discuss here at this time. It is presumed, however, that the Interstate Commerce Commission considered it a reasonable charge, or it would not have granted the right to the carriers to embody same in their tariff.

However, the shippers of the country do not consider the charge a reasonable one, and are making an effort, in a case pending before the Interstate Commerce Commission, to have the charge eliminated. The shippers may not succeed in doing this, therefore the necessity of sanitary officers, both state and federal, not imposing a requirement for the cleaning and disinfecting of cars, except when absolutely necessary.

Referring again to the order of the federal government in
1915, I take the position, gentlemen, as a shipper, that there was no necessity for such a sweeping order. I also take the position that there was no necessity for the requirements issued by a large number of our states calling for the cleaning and disinfecting of cars for the shipment of live stock into these respective states, and it was entirely on account of the federal order, and the order of the various states, that the charge of $2.50 and $4.00 per car against the industry was made by the railroads, as heretofore mentioned.

I never could understand why it was necessary to clean and disinfect a car that was not used in the foot and mouth disease infected territory, or even in territory adjacent to the infected territory. While the shipper is not opposed to the cleaning and disinfecting of cars when necessary, he is opposed to the requirements when it is not necessary. This is his position regardless of whether he pays the charge for the cleaning and disinfecting, or the railroads absorb same.

Another proposition I desire to call attention to, relating to the cleaning and disinfecting of live stock cars is, that cars hauling tick infested cattle from southern territory to northern markets, in our opinion do not need to be disinfected before returning to said territory for the movement of like kind of cattle.

I am advised by representatives of the railroad companies that they have made special requests of the Bureau of Animal Industry for the privilege of moving these cars back to the tick infested area, for the movement of that class of cattle, their request being refused.

I desire here to draw the line as to the words cleaning and disinfecting of cars. The two ought not to be coupled together. It is well understood by every one that the railroad companies should furnish clean cars for shippers to handle live stock, and we take the position that it is just as important that the carrier follow this requirement, as it is to furnish a clean car for you and me to ride in, and if the shipper is to bear any expense at all in this matter, it should not be for the cleaning of a car, but only for its disinfection.

I sometimes think that sanitary officers give but little consideration to the effect of the rules and regulations they issue, especially the rules relating to the cleaning and disinfecting of cars. I never could understand why any state sanitary officer should embody in his rules and regulations the requirement for cleaning and disinfecting of cars for the shipment of horses into his state, yet quite a number of states have such requirements in their regulations.

I desire to place myself on record here, as being absolutely opposed to any state regulations interfering in any way with the
interstate movement of live stock, when privileged to do so by the rules and regulations of the federal Bureau of Animal Industry. I do not mean by this that I consider that all rules and regulations for the interstate movement of live stock should be promulgated by the Bureau of Animal Industry, but I do mean that the Bureau of Animal Industry and the various states should cooperate to the extent of issuing their rules for the interstate movement of stock in harmony with each other. This can be accomplished by placing several states within a shipping zone, having the state requirements and the federal requirements the same, as applying to that particular district. I am sure this would eliminate a great many evils that now exist in the interstate movement of live stock.

So many rules and regulations are confusing to the shipper, and in a great many instances cause unnecessary expense to meet the requirements. I think it important, gentlemen, that this body of sanitary officers discuss these questions seriously, and I am speaking now not only as a shipper, but as a sanitary officer as well, and I feel sure that unless the federal Bureau of Animal Industry and state sanitary officers get together and formulate uniform rules and regulations, and change from present methods, that the shippers of the country will see that there are laws passed requiring them to do so.

I believe I speak advisedly on this subject, and am not doing so to alarm you in any way, but simply to bring it to your attention.

All over the country, and especially in the west, live stock associations are being organized, national associations of live stock interests are being organized, and they are discussing these propositions that I am bringing to your attention today, and I feel sure that unless you, as sanitary officers, get together and work out a practical plan relating to the movement of live stock, both state and interstate, that it will be done for you.

Gentlemen, another proposition affecting the cleaning and disinfecting of live stock cars is the adherence to the rule calling for same. Too many sanitary officers adhere too strictly to the rule issued. To illustrate: Last spring a shipment of thirty-three cars of cattle originated in Oklahoma, destination Kansas pasture. On account of delay enroute they were required to be unloaded for feed and rest in the Wichita stockyards. While they were in these yards the government inspector stationed at that point found them to be infected with scabies. Under the government rule these cattle would have to be dipped, and then held ten days, and dipped a second time, before they could be moved. Under the circumstances it was impossible to handle this bunch of cattle in this manner, and from the fact that they were consigned to a
point in the state, the attorney general of the state gave us his opinion that after they were unloaded from the cars, they became subservient to the rules and regulations of the Live Stock Sanitary Commissioner of Kansas; therefore these cattle were permitted to be reloaded and shipped on to their destination.

What I want to illustrate is this, that the rule of the Bureau of Animal Industry calls for the cleaning and disinfecting of the cars in which the mange-infected cattle were shipped. This was done at a cost of $2.50 to the shipper. After the cattle were dipped and reloaded and shipped to their destination, the cars in which they were shipped were ordered to be cleaned and disinfected, thereby entailing another charge of $2.50 for the cleaning and disinfecting of the cars. This all on account of the strict adherence to the rule for the cleaning and disinfecting of cars by the Bureau of Animal Industry. If there is a sanitary officer in this house that will stand and say that there was a necessity for the cleaning and disinfecting of the cars a second time, I would like to have him do so.

I think it very important that such unnecessary requirements be eliminated from both federal and state regulations. In fact, I believe that such matters should be largely left to the judgment of the man actually in charge of the situation.

Another illustration: A few days ago a shipment was made of three or four cars from a Kansas station to the Kansas City stockyards, and when the shipment arrived at Kansas City, under inspection, one cow was found to contain live mange mites. It was impossible to tell what car the cow came from, therefore, all the cars were ordered cleaned and disinfected, at a charge of $2.50 per car. The Stockyards Company was required to clean and disinfect the alleys and pens where these cattle were held. The railroad company was required to disinfect the loading pens and chutes where the cattle were loaded; all because of a rule calling for same.

I take the position that it was absolutely unnecessary for the cleaning and disinfecting of the cars containing this shipment, or the cleaning and disinfecting of the premises where they were held, and I challenge any man to show me, or give any record of where mange infection was ever carried in cars so slightly infected.

I also take the position as a shipper, that it is necessary to clean and disinfect cars under certain conditions, and especially do I think it necessary to clean and disinfect cars when handling stock hogs or breeding hogs. I believe close adherence to requirements of this kind is essential, from the fact that it is no trouble to show that cholera can be spread by the shipping of non-
immune hogs in cholera-infected cars, or loading them through cholera-infected stock pens.

The question of cleaning and disinfecting cars handling tuberculous cattle, I will not discuss. It is not being done, but it occurs to me that it is one of the important things that should be looked into.

I have brought these things to your attention as a shipper, for your consideration and thought, and I sincerely hope that some scheme or program can be worked out whereby a uniform understanding and plan can be had among the states as to the movement of live stock, relating to matters of this kind.

Just a word or two in closing: This organization is twenty-two or three years old, I have attended four or five of your meetings in the last seven or eight years, and have always been pleased to be with you. I am aware a majority of you sanitary officers are professional men, veterinarians, who have been placed in charge of the sanitary affairs of your respective states, and are perhaps used to technical matters. I do not believe this organization is meeting the purposes for which it was organized in following the program it does. I have listened to a great many papers read and talks made that appeared to me to be more like a college professor lecturing to his graduating class, than a meeting of sanitary officers.

I am sure I would much prefer to come here and listen to what some sanitary officer is doing in the way of cleaning out contagious and infectious diseases among the live stock of his state, how he is doing it, etc., than to listen to some theoretical ideas on the effect of medicines, etc. I do not believe this is the place for lectures of that kind.

What I am saying in this regard, gentlemen, is meant in the kindliest spirit, I do not want any one to take offense at what I say, but I am bringing this to your attention as a member of this association for your thought and consideration.

One other thing, I notice that a great deal of the time of these meetings is taken up by some one in advertising some serum or bacterin that he may have discovered. I do not believe this is the place to advertise medicines. If one has something good, let him go out to the country and demonstrate to the public, and the public will take care of them. Another thing, you do not seem to agree upon these technical matters. When such men as Dr. Eichhorn and Dr. Haslam disagree upon the merits of certain serums or bacterins, what are laymen like myself to do or believe?

I believe these matters should be discussed at veterinary gatherings, and not at this United States Live Stock Sanitary Association's annual meeting.
I have brought these matters to your attention not only as a shipper, but as a sanitary officer of several years' experience in the live stock sanitary work in a big live stock state.

DR. KIERNAN: Mr. Chairman, I disagree with Mr. Mercer respecting his recommendation as to the disinfecting of cars that have contained ticky cattle. Mr. Mercer contends that during the winter weather those cars do not need to be cleaned and disinfected, for the reason that the debris in the car has become frozen, thereby killing the ticks or tick eggs. If it were a fact that all of these cars containing manure and straw were subjected to a temperature of four degrees below zero, all the ticks and tick eggs would be killed, but as a matter of fact, cars containing tick-infested cattle are shipped from the southern states, to market points, and are immediately sent back to points in southern states, perhaps into the infested area, or perhaps into the free area, and if these cars were not cleaned and disinfected during the winter months, the effect would be that each year there would be outbreaks of tick fever in those states, in the northern states, too, because a tick will withstand a temperature of four degrees above zero. That has been tried in Tennessee. In 1912 in some counties they had a temperature of 15 degrees below zero, and the following spring and summer they had as many ticks as they had the previous year. It is very true, as Mr. Mercer says, that if they were frozen they would be killed, but many times they are protected by the straw left in the car, and they are not frozen. Therefore, it is considered a dangerous proposition, and I doubt very much whether the live stock owners of any of the states would recommend that those cars should not be cleaned and disinfected at the time that they come into a free area.

We are cleaning up the tick-infested area at a rapid rate now. This year nearly 70,000 square miles have been freed of the tick, and at a corresponding rate, it would only take about four or five years to clean up the entire tick-infested area in the United States. Therefore, I think that the live stock owners of the country can withstand whatever hardship apparently may be imposed upon them by the cleaning and disinfecting of cars, because it has proved to be their protection, and the outbreaks of Texas fever have been reduced very materially since this order went into effect.

On the other hand, Mr. Mercer, as I understood him to say, recommends that all cars containing shipments of hogs going to market be cleaned and disinfected, and coming back again cleaned and disinfected. Instead of reducing the amount of work of cleaning and disinfecting the cars, it will increase it ten times over what it is now. There are at the present time 105,000 stock cars in the United States, 83,487 public stock cars, and 21,792 privately owned cars.

During the fiscal year of 1917 there were about 61,798 cars cleaned and disinfected under the Bureau's supervision. Why? Because the cars were known to have contained hogs affected with cholera, cattle infested with ticks and, cattle and sheep affected with scabies. The Bureau has not undertaken to require the cleaning and disinfecting of all cars. It is not a fact that the Bureau got out an express order during the foot and mouth disease requiring the cleaning and disinfecting of all cars. It required the cleaning and disinfecting of cars that came into states in which the foot and mouth disease existed for a short period of time. It required the cleaning and disinfecting of cars from market points of public or state cattle. During that year of the foot and mouth disease
323,000 cars were cleaned. A great many of these cars were cleaned by request of the railroads and various state officers of the areas affected with foot and mouth disease, their regulation requiring that no cars should be brought into their states until they had been cleaned and disinfected. The Bureau is always willing to accept the advice of live stock owners and live stock sanitary officials, and they do not disregard the recommendations that they make. They give them their consideration, and if it is for the benefit of the masses of the live stock owners of the country, the regulations are easily promulgated and issued for their benefit.

DR. PETERS: Mr. Chairman, I move that the discussion on the disinfecting and cleaning of stock cars be deferred, and that the report of the special committee be now read, because, Mr. Chairman, there are a number of men here that cannot be with us this afternoon, and they came here especially to hear this report.

The motion was duly seconded.

MR. MERCER: Mr. President, I just want to answer one remark made. I did not say that I was opposed to the cleaning of cars that had contained southern cattle. I said nothing of the kind. I think that every car coming from the southern district should be cleaned. I did not say that I did not consider it necessary to disinfect those cars in freezing weather.

Dr. Peters' motion prevailed.

PRESIDENT WILLS: We will proceed to the report of the special committee on "Tentative Plan for Accredited Tuberculosis-Free Herds" of which Dr. Kiernan is chairman.

The regulations as prepared by the committee were read before the association, and after being fully discussed were finally adopted as follows:

**Proposed Regulations For Accrediting Herds of Cattle.**

An accredited tuberculin tested pure-bred herd is one which has been tuberculin tested by the subcutaneous method, or any other test approved by the Bureau of Animal Industry, 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 being conducted. Further, it shall be a herd in which no animal affected with tuberculosis has been found upon two annual or three semi-annual tuberculin tests, as above described, and by physical examination.

The entire herd, or any cattle in the herd shall be tuberculin tested or retested at such time as is considered necessary by the Federal and State authorities.

No cattle shall be presented for the tuberculin test which have been injected with tuberculin within sixty days immediately preceding, or which have at any time reacted to a tuberculin test.

No herd shall be classed as an accredited herd, in which tuberculosis has been found, by the application of the test as referred to in paragraph one, until such herd has been successfully subjected to two consecutive tests with tuberculin, applied at intervals of not less than six months, the first interval dating from the time of removal of the tuberculous animal from the herd.

Prior to each tuberculin test, satisfactory evidence of the identity of the registered animals shall be presented to the inspector. Any grade
cattle maintained in the herd, or associated with animals of the herd, shall be identified by a tag, or other marking, satisfactory to the State and Federal officials.

All removals of registered cattle from the herd, either by sale, death or slaughter, shall be reported promptly to the said State or Federal officials giving the identification of the animal, and, if sold, the name and address of the person to whom transferred. If the transfer is made from the accredited herd to another accredited herd, the shipment shall be made only in properly cleaned and disinfected cars. No. cattle shall be allowed to associate with the herd, which have not passed a tuberculin test approved by the State and Federal officials.

All milk and other dairy products fed to calves, shall be that produced by an accredited herd, or if from outside or unknown sources, it shall be pasteurized by heating to not less than 150°F. for not less than twenty minutes.

All reasonable sanitary measures and other recommendations by the State and Federal authorities for the control of tuberculosis, shall be complied with.

Cattle from an accredited herd may be shipped interstate, by certificate obtained from the Office of the State Live Stock Sanitary Officials of the state in which the herd is located, or from the Office of the Bureau of Animal Industry without further tuberculin test, for a period of one year, subject to the rules and regulations of the state of destination.

Strict compliance with the above rules and regulations shall entitle the owners of tuberculosis free herds, to a certificate (Tuberculosis Accredited Herd) issued by the Bureau of Animal Industry and the State Live Stock Sanitary Authority, said certificate good for one year from date of test, unless revoked at an earlier date.

Violations of the letter or spirit of these regulations shall be considered sufficient cause for immediate cancellation of co-operation by the State and Federal officials.

Committee Representing Breeders Association: Mr. Weaver, Mr. Glover, Mr. Escher, Mr. Dering, and Mr. Cook.

Committee representing United States Live Stock Sanitary Association: Mr. Kiernan, Dr. Ward, Dr. Moore, Dr. Butler, and Dr. Gibson, Chicago, Illinois.

Dr. Dyson: Just what does that provision requiring one year mean, when does it start? If all the animals in the herd pass the test, it would require one year and one day for the herd to become accredited under this system. I believe this is a very urgent matter, and I have discussed the question of the accredited herds here on several occasions, and there was not much interest manifested in it, but the idea is to get it under way. It is a question as to whether the value of a test within 90 days provided for the first test can be demonstrated 60 days after the tuberculin test. Then you require that one year shall intervene between the first and final test, and that would entitle the herd to become accredited. Is not a tuberculin test used everywhere 90 days after the first initial test, and is it not just as good as it would be in one year? Take a man with 100 head of cattle in a herd, all of which have successfully passed the initial test, he would be required to wait one year before he could administer the second and final test. In the meantime suppose he wanted to purchase ten animals, for instance, six months
after the initial test. He would have to keep them segregated from his hundred head of cattle, and then it would require a year and a half before he could have his whole herd accredited under that system, and is it not possible that animals may get into that herd that come from an infected herd, although it had passed the negative test, and would it not be just as apt to react in 90 days under the tuberculin test as it would be one year after.

The convention adjourned until two o'clock.

SIXTH SESSION.

December 5, 1917, at two o'clock.

PRESIDENT WILLS: The chair is advised that the previous motion, or the acceptance of the Committee's report on tuberculin free herds was put and acted upon, without acting upon the amendment. My understanding was that Dr. Reynolds, who is not here yet, I believe, withdrew his amendment, and moved the previous motion. I do not know whether he did or not, but that is my understanding, and that is why I make the motion as to the acceptance of the report. What is your desire, or what is your wish in the matter? It is a matter for the assemblage to pass upon. What action shall we take?

DR. POTTER: Mr. Chairman, I believe that your idea in the matter is correct. I think that he withdrew his amendment and moved the previous question.

(At this point Dr. Reynolds entered the room.)

PRESIDENT WILLS: Dr. Reynolds, the question has arisen as to whether just before lunch you withdrew your amendment, and moved the previous motion, which I put, and which was acted upon, and some have stated that there was an amendment before the house, and that my action was out of order, in allowing the putting of that motion.

DR. REYNOLDS: Mr. Chairman, I guess we are a little bit mixed on this question. I did not withdraw the second to the motion, but the suggestion which I made was incorporated in the report by Dr. Kiernan, before the motion was put by the chair, and I understood the motion by the chair to be on the adoption of the report, and I understood his announcement to be on the adoption of the report, and the report was adopted.

There probably are very much better parliamentarians here than I am, but my understanding of such a situation is that when the chairman puts a motion and announces clearly the motion, and the body before him takes a vote on that statement, and the chairman makes the announcement, that the matter is closed; at any rate that is the exact situation. The amendment was not withdrawn by me formally, but was incorporated in the report by Dr. Kiernan before the vote was taken, and the manuscript handed in.

PRESIDENT WILLS: The only thing we can do under parliamentary rules, is to reconsider, if it is worthy of that action.

DR. REYNOLDS: Would you rule, in order that there may be no possible question, that the motion to adopt the report as amended would now be in order? My understanding is that the matter is closed, and it is perfectly satisfactory to me.

PRESIDENT WILLS: That would have the same effect, Dr. Reynolds, as moving to reconsider.

DR. GIBSON: Mr. Chairman, I rise to a point of order. Inasmuch as
the statement of the chair and the statement of Dr. Reynolds agree, the record is made in the matter, that it be considered settled and not before this body at this time.

PRESIDENT WILLS: We had remaining from the morning session the discussion on the cleaning and disinfecting of cars. Is there anything further on this?

DR. MOHLER: Mr. President, in order that the record may be clear on this paper of Mr. Mercer's, I want to make a statement. I have discussed with Mr. Mercer, two statements that he made, and I think that we are in accord on the question, but there has been a misunderstanding.

Mr. Mercer referred to a shipment of 33 cars of cattle from the Wichita yards, and the cleaning and disinfection of the 33 cars containing those cattle. Now, I do not dispute Mr. Mercer's assertion that the cars were cleaned and disinfected, but the Bureau regulations do not require the cleaning and disinfecting of cars that have contained scabies cattle, or cattle exposed to scabies.

In regard to the shipment of swine, I think Mr. Mercer will agree with this statement on the part of Dr. Kiernan. I think possibly Mr. Mercer made his statement in a way that he did not intend to. His statement was that cars containing swine shipped interstate should be cleaned and disinfected. Mr. Mercer thinks that he made the statement that that should apply to stock hogs, and I agree with him and call your attention to the fact that the Bureau regulations since July 1, 1910, would require the cleaning and disinfection of all cars in which stock hogs were shipped, to be loaded for interstate shipment. That has no application to shipments of hogs for slaughter, and as I understand Mr. Mercer, he does not believe that cars carrying hogs to market centers be required to be cleaned and disinfected.

I am simply making these statements so that the Bureau's position in regard to these matters will be clear. I think the understanding that some of the members here would have taken was that our regulations require the cleaning and disinfecting of cars containing shipments of scabies cattle, and cattle exposed to scabies, but such is not the fact; and that our regulations did not require cleaning and disinfecting of cars into which are to be loaded stock hogs, when in fact our regulations do require such cleaning and disinfecting.

DR. GIBSON: Mr. President, just a word about Dr. Mercer's remarks about the expense of disinfecting cars. I do not believe we should go away from this meeting believing that a fee of $2.50 per car single-deck and $4 for double-decks is a proper fee. If these cars were disinfected after all shipments, it would not cost any such sum as that to do it. They have universal car disinfection in the Dominion, and Dr. Torrance states that he figures it costs 75 cents per car. You know and the Bureau men know that there was an average of about 5,000 pounds of litter taken out of the stock cars in this country at the time of the foot and mouth trouble. You know, it was worth $2.50 and maybe more to clean that kind of a car, to say nothing about disinfection; but I have sometimes thought that Dr. Mercer has a wrong view of the difference between the expense of cleaning a car and disinfecting a car. If I am not mistaken, the disinfecting costs less money than the cleaning, and if cars were regularly cleaned and properly bedded, it would take only a few minutes to clean out the inside of a car after a shipment, and the dangers that Dr. Kiernan referred to, as to the carrying of the Texas ticks without freezing them in pretty cold weather, applies readily to any car that contains 5,000 pounds of heating manure litter in the car.
It is a very nice place for a tick that has accidentally got north, to keep warm until he goes back south, and in that respect a car that was not cleaned and disinfected would be the most dangerous one. A car that was cleaned and bedded with about one inch of sand could be cleaned in a very few minutes, and with little expense, and my opinion is that these cars if cleaned regularly could be cleaned at destination at an expense of not to exceed one dollar per car. As to the question of who should pay for it, there is no use debating that. "Jones" always has paid the freight, and I presume always will.

PRESIDENT WILLS: We will now proceed to the business of the session. The first is the report of the Committee on Finance, by Dr. Crewe.

REPORT OF THE COMMITTEE ON FINANCE.

Your committee has checked the accounts of the Secretary-Treasurer and found same to be correct. (For summary see report of Secretary-Treasurer.)

W. F. CREWE, Chairman.

Financial Statement.

Balance on hand December 1, 1916................................................................. $1,856.68

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Expenses........................................................................................................ 1,558.31

Balance on hand November 30, 1917................................................................. $1,517.62

Receivable from Program Advertising.............................................................. 555.00

$1,517.62

PRESIDENT WILLS: Gentlemen, you have heard the report of the Committee on Finance. What is your pleasure.

On motion duly seconded and carried, the report of the Committee was accepted.

PRESIDENT WILLS: The next is the report of the Grievance Committee, by Dr. Musselman.

DR. MUSSELMAN: Mr. President, as chairman of the Grievance Committee, it pleases me very much to announce to you that we have none.

PRESIDENT WILLS: I think that will be accepted without question.

The report of the Advisory Committee to the Secretary, by Dr. Flower, of Louisiana.

DR. FLOWER: We have no report to submit.

PRESIDENT WILLS: The next is the report of the Committee on Tick Eradication, by Dr. Jacob.

REPORT OF COMMITTEE ON TICK ERADICATION

The report of the Committee on Tick Eradication is comparatively brief. It is brief for the reason that the work which has been accomplished speaks for itself.
There was never a time in the history of our country when the question of tick eradication appeared so important in its relation to our agricultural resources as at present, as the result of recent events, which have impressed upon the nation the necessity of utilizing to the fullest extent those things which tend toward a stronger and more resourceful country. Up to this time it has had its bearing largely from a sectional and nation-wide standpoint but today it is world-wide, and as the conflict of nations continues, the importance of developing our southern agricultural resources becomes more and more apparent.

A study of the economic phase in live-stock production has demonstrated beyond a doubt that those states which we collectively term the "South" are destined to become the permanent great cattle section of the country, but this will be in direct proportion to the eradication of the southern cattle fever tick. When the work on tick eradication was begun through federal and state co-operation it appeared, and justly so, as a most stupendous task, and in the minds of many there existed an element of doubt, but as on several other occasions the efficiency of our great live-stock sanitary system is here demonstrating its capabilities. At present anything which retards our national efficiency is considered an aid to the enemies of our country, in this the cattle tick is no exception; consequently, any measures which tend to prolong its existence within this country are wholly unjustifiable. On the other hand, the application of every practical measure toward tick eradication is most patriotic and in keeping with our present-day national policy. Statistics furnished to this committee by the Bureau of Animal Industry reveal the following:

On July 1, 1906, there were 15 states having tick-infested areas, representing a total of 728,565 square miles.

On Dec. 1, 1917, there were ten states with tick-infested areas, with a total of 349,253 square miles, showing that 379,312 square miles, or 52 per cent, of tick-infested area has been released, and from which live stock can now be moved without quarantine restrictions.

During the fiscal year ending June 30, 1917, 24,390,721 dippings of cattle were made for the eradication of ticks, and the statement is made that this number will be increased somewhat during the fiscal year ending June 30, 1918.

An analysis of the Bureau statistics indicates without any doubt that the existence of the southern cattle fever tick within the United States is a matter of comparatively short duration. All states now fully realize its importance, much of the pioneer, especially educational work, which must precede all successful disease eradication work has been done and the burdens of the future should not be what they have been in the past. It is the feeling of the committee that in order to stimulate the most active work along this line that the movement of tick-infested cattle should be prohibited at any time or for any purpose. There are many who have been more or less indifferent to dipping requirements because it has been possible under certain restrictions to move tick-infested cattle for immediate slaughter. The time has come when the tick must not be tolerated under any conditions. It is needless to elaborate further on what has been done and what will be done. The federal and state authorities should be congratulated in their great work on the eradication of the southern cattle fever tick, and furthermore the unstinted active and moral support of the United States Live Stock Sanitary Association is justly theirs.

(Signed) M. Jacob, Chairman, Peter F. Bahnson, E. M. Ranck.
TWENTY-FIRST ANNUAL REPORT
UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ANIMAL INDUSTRY
Washington, D. C.

Progress in Tick Eradication, July 1, 1906, to December 1, 1917.

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*Only portions of 5 of the 61 counties were quarantined.

PRESIDENT WILLS: You have heard the report of the Committee on Tick Eradication. What is your pleasure as to this report?

The report was unanimously accepted.

PRESIDENT WILLS: The next is the report of the Committee on Credentials, by Dr. Bahnsen. We will pass that for the present, and ask Mr. Mohler to report as chairman of the Committee on Legislation.

REPORT OF COMMITTEE ON LEGISLATION

DR. MOHLER: Mr. President and Fellow Members: Your committee has reviewed such new laws and regulations of the various states as were submitted since our last meeting and begs to submit the following report:

The changes which have been made in the sanitary requirements governing admission of live stock into the respective states will be summarized.

Alabama

Hogs.—Serum alone within 10 days or the simultaneous treatment not less than 21 days previous to shipment now required in addition to certificate of freedom from exposure previously required. Disinfection of car or crate also required.

Arizona

Cattle.—Subcutaneous tuberculin test now designated. Health certificate for range cattle.

Connecticut

Cattle.—Cattle for slaughter subject to inspection at time of slaughter.

Florida

Cattle.—Subcutaneous, intradermal, or ophthalmic test accepted. All cattle admitted except for immediate slaughter shall be free from ticks.
Georgia

Hogs.—Placarding of cards "Exposed to hog cholera" required for shipments to recognized slaughtering centers for immediate slaughter. Inoculation required for hogs reshipped from stockyards to farms.

Indiana

Sheep.—Provides for shipment to destination for dipping on state permit.

Hogs.—Provides for issuing permit for removal of healthy swine from public stockyards when vaccinated by licensed veterinarian under supervision of authorized state or federal veterinarian.

Kansas

Horses, mules and asses.—Certificate of soundness required only for stallions and jacks, together with affidavit that they are free from any contagious, infectious, or communicable disease.

Kentucky

Hogs.—Now admitted on health certificate showing that they are free from disease and have not been exposed thereto preceding 60 days; otherwise, certificate required covering immunization. Time interval between treatment and shipment is changed from 21 days to 14 days when serum and virus is used.

Louisiana

Horses, mules and asses.—Mallein test now required in addition to health certificate.

Hogs.—The interval between serum-alone treatment and shipment is changed from 20 to 10 days.

Maine

Horses, mules and asses.—Health certificate including mallein test by approved state or federal veterinarian now recognized.

Cattle.—Health certificate including tuberculin test by approved state or federal veterinarian now recognized.

Hogs.—Restrictions removed.

Maryland

Hogs.—Immunization now required for purposes other than slaughter.

Massachusetts

Hogs.—Permit now required for purposes other than immediate slaughter.

Minnesota

Horses, mules and asses.—Unbranded horses admitted on health certificate.

Cattle.—Pure-bred cattle, except from officially accredited tuberculosis-free herds, must be quarantined at destination and held for retest not later than 60 days after arrival.

Mississippi

Horses, mules and asses.—The mallein test is now required in addition to health certificate.

Cattle.—Cattle from accredited tuberculosis-free herds admitted on health certificate without tuberculin-test chart.

Missouri

Cattle.—The words "exposed to tuberculosis on day of inspection" are
no longer required to be written on the certificate in case any animal
in the lot inspected is found tuberculous.

Nebraska
Cattle.—Pure-bred cattle not from accredited tuberculosis-free herds
must be moved to destination and be held under state quarantine until
official test is administered after 60 days. Certificate of Illinois authori-
ties is now accepted.
Hogs.—Immunization now required for stocking, feeding and breeding hogs.

Nevada
Horses, mules and asses.—Mallein test no longer required.
Cattle.—Restated under different classes without material change.
Hogs.—Health certificate now required for purposes other than im-
mediate slaughter.

New Mexico
Cattle.—Retest required for breeding and dairy cattle 90 days after
reaching destination.

Ohio
Cattle.—Health certificate required for calves under six months of
age for dairy and breeding.

Oregon
Horses, mules and asses.—Mallein test not required for horses for
racing and exhibition purposes.
Cattle.—Bureau tuberculin-test certificate no longer required for cattle
originating in South Dakota.
Hogs.—Hogs which have come in contact with any public corral, yards,
or chutes or undisinfected cars shall be immunized before they may be
sold for feeding or breeding purposes.

South Dakota
Horses, mules and asses.—Special certificate of soundness and health
for stallions and jacks required.

Utah
Cattle.—Cattle from accredited tuberculosis-free herds accepted on
statement to that effect from state or federal official. Branded range
cattle admitted on health certificate.

Respectfully submitted,
J. R. MOHLER,
C. E. COTTON,
LESTER H. HOWARD.

PRESIDENT WILLS: You have heard the report. What is your pleasure?
The report was accepted.

REPORT OF THE COMMITTEE ON CREDENTIALS.

DR. BAHNSEN: The following applications for membership have been
presented to you:

APPLICATION FOR MEMBERSHIP.
Gustafson, S. L., Deputy State Veterinarian, Searcy, Ark.
Bernath, R. I., Veterinarian, Wauseon, Ohio.
Sorensen, A. S., Vet. In charge Western Lab., Stockton, Cal.
Rudolph, Jas., A., City Food Inspector, Madison, Ind.
Hubbell, Sterling B., Dairy Farmer, Shelton, Conn.
Smith, Wright J., Veterinarian, Kingston, N. Y.
Faust, Otto, Veterinarian, Poughkeepsie, N. Y.
Fitch, Prof. Clyde F., University Farm, St. Paul, Minn.
Brigham, Hon. E. S., Commissioner of Agr., St. Albans, Vt.
Munce, Thos. W., B. A. I., Trenton, N. J.
Rogers, Burton R., Western Weighing Inspection Bureau, Chicago, Ill.
Beaumont, A. E., Sec'y Sanitary Board, Pierre, S. D.
Reed, Raymond C., Chief, B. A. I., College Park, Md.
Burnett, Theo. A., State Veterinarian, Columbus, Ohio.
DeMilly, J. W., Acting State Vet., Tallahassee, Fla.
Williams, N. F., Fort Worth, Texas.
Jarrel, E. F., State Vet., Fort Worth, Texas.
Burson, W. M., Prof. Vet. Medicine, Athens, Ga.
Hoggen, R. W., State Vet., Salt Lake City, Utah.
George, J. Gilbert, Bacteriologist, Kansas City, Mo.
Treleaven, W. T., Live Stock Agt., Santa Fe, Kansas City, Mo.
Schilling, Dr. Sam James, Ohio State College, Columbus, Ohio.
Martin, A. W., Biggsville, Ill.
Wilson, I. D., Veterinarian, State College, Pa.
Donohue, R. J., Chief Dairy Dept., Olympia, Wash.
Goss, L. W., Prof. Pathology, Manhattan, Kan.
Brewer, F. W., State Vet., Oklahoma City, Okla.
Whittlesey, J. M., Commissioner, Domestic Animals, Hartford, Conn.
Bushong, J. P., Vet. Lederle Lab., New York City, N. Y.
Knapp, Dr. G. A., Veterinarian, Millbrook, N. Y.
Jones, J., Veterinarian, South Charleston, Ohio.
French, W. H., Veterinarian, Redfield, S. D.
Washburn, W. B., Tiffin, Ohio.
Smith, H. R., Commissioner, Chicago, Ill.
Gordon, Darby, R. N., Veterinarian, Barrington, Ill.
Simkins, Dr. H. R., Veterinarian, Elmwood, Ill.
Piper, H. B., Sharon, Wis.
Deadman, C. A., Madison, Wis.
Tuttle, Geo. W., Pine Plains, N. Y.
Tillman, A. E., Veterinarian, Earlville, Ill.
Deubler, E. S., Veterinarian, Narberth, Pa.
Anderson, Dr. Frank H., Veterinarian, Evanston, Ill.
Kyle, Dr. M. H., Chatsworth, Illinois.
Shaw, Dr. W. H., Veterinarian, Pawnee, Ill.
Gibson, J. E., Indianapolis, Ind.

DR. BAHNSEN: Your Committee has investigated the qualifications of the applicants. We recommend that they be elected to membership in this association. We also have five requests for withdrawal from the Association. They are:

Dr. Robt. W. Ellis, New York City.
Mr. Avery Turner, Amarillo, Texas.
Mr. B. Heide, Chicago, Ill.
Dr. R. P. Steddon, Washington, D.C.
Mr. J. Brinker, Chicago, Ill.

DR. GIBSON: Mr. Chairman, I move that the recommendation of the Chairman of the Committee on Credentials be accepted, and that the secretary be instructed to cast the unanimous ballot of this association for the election of the candidates who have been recommended for admission to membership.

The motion was duly seconded and carried.

SECRETARY WARD: I hereby declare the candidates whose names you have heard read duly elected to membership in this association.

PRESIDENT WILLS: I suppose the proper procedure is to act also upon the five names that Dr. Bahnson reports as desiring to withdraw.

DR. DUNPHY: I move that the recommendation be accepted and that they be allowed to withdraw their names.

The motion was seconded and carried.

PRESIDENT WILLS: We have a report of a special committee to consider the acceptance of affidavits of owners of pure-bred swine in lieu of veterinarians' certificates. I do not know that I have stated it exactly as the resolution was worded, but that is the substance of it. Dr. Dyson is the chairman of that committee, I believe.

REPORT OF THE COMMITTEE ON AFFIDAVITS OF OWNERS VS. VETERINARIANS' CERTIFICATES.

DR. DYSON: This, you understand, is just passed up to the Association for action. In view of the handicaps and delays incident to the methods of inspection and issuing of health certificates to cover the interstate shipment of swine, your committee begs to submit as follows:

That the interstate shipment of pure-bred swine by express in crates be permitted when accompanied by an affidavit of the owners 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 said swine have not been subjected to the serum and virus treatment within thirty days immediately prior to the date of shipment.

PRESIDENT WILLS: You have heard the report of the committee. What is your pleasure?

DR. LEECH: I move the adoption of the report.

The motion was duly seconded and carried.

PRESIDENT WILLS: We will now have the report of the Resolutions prepared by the Committee on Resolutions, by Dr. Dyson.

Resolutions.

WHEREAS, The Act of Congress prohibiting the interstate shipment of cattle which react to the tuberculin test has been found by practical test to impose an unnecessary hardship upon the live stock industry without accomplishing any beneficial results in the control and eradication of tuberculosis of live stock.

RESOLVED, That the United States Live Stock Sanitary Association recommend to the Honorable Secretary of Agriculture that the section of the Act of Congress referred to in the first paragraph of this resolution be repealed and that the interstate movement of tuberculous cattle be governed by regulations promulgated and issued by the United States Department of Agriculture.

WHEREAS, A number of the state fairs are requiring a certificate of health and tuberculin test on all bulls, cows and heifers offered for exhibition; therefore, be it

RESOLVED, That this association recommend to the State Fair Association that this requirement be adopted by all state and county fairs and live stock exhibitions.
RESOLVED, That this association recommend the hastening of these experiments with intradermal and ophthalmic tuberculin tests; therefore, be it
RESOLVED, That this association recommend the hastening of these experiments with a view of establishing at an early period their reliability.

WHEREAS, Contagious abortion causes great losses to the live stock industry, and
WHEREAS, It is necessary that concerted effort be made to find a cure or means of control; therefore, be it

RESOLVED, That Congress be urged to set aside a substantial sum to the Bureau of Animal Industry for the prosecution of this work, and that the agricultural colleges be asked to correlate with the Bureau of Animal Industry in finishing this work, so that no overlapping of effort be made.

Upon motion, duly seconded and carried, the Resolutions were adopted as read.

DR. DYSON: Is it proper to move at this time that copies of the resolutions be furnished, for distribution to the members? If so, I make that motion.

PRESIDENT WILLS: The question of cost perhaps should be considered.

DR. DYSON: There are two Resolutions which I think should be brought to the attention of Congress. They will do very little good unless they are brought to the attention of Congress.

PRESIDENT WILLS: The Chair would entertain a motion that copies of these Resolutions be, at the discretion of the secretary, sent to the proper persons interested, the Chairman of the Agricultural Committee on Appropriations in the Senate and House of Representatives, I presume, would be about all that are necessary.

DR. DYSON: I think a sufficient number of copies should be furnished to the members of the Bureau, so that they can be furnished to the proper parties.

PRESIDENT WILLS: Do you make that a motion?

DR. DYSON: I make that as a motion.

The motion was duly seconded and carried.

PRESIDENT WILLS: We come now to the order of new business.

SECRETARY WARD: The only thing, Mr. President, that I want to call the attention of the Association to, is the question of whether or not dues should be increased. It has been suggested by several members that the dues should be increased to at least $2 a year, and the dues to cover cost of a copy of the annual report.

A MEMBER: Mr. Chairman, that was referred to the Executive Committee, I believe.

PRESIDENT WILLS: Yes, you are right. Is there anything else under the head of new business before we proceed to the election of officers?

MR. FELKER: Mr. President, may I inquire if the association has taken any action in regard to the bill before Congress, introduced by Mr. Sloan, of the Appropriation Committee, providing a million dollars to carry on this work? I remember at the banquet the other night something was said, but it seems to me no action was taken, and that it would be advisable for this association to take some action favorable to that matter.

SECRETARY WARD: I understood that matter would be referred to the Secretary of Agriculture. That was the recommendation made by the Live Stock Exchange.

A MEMBER: This association has taken no action. The action taken was by another association entirely.

PRESIDENT WILLS: Do you wish to make that in the form a resolution, Mr. Felker, or a motion?

MR. FELKER: I would offer it in the form of a motion, perhaps, that the association take such action as is necessary to encourage the
appropriation of money through the passage of the bill known as the Sloan Bill, which provides for one million dollars.

The motion was seconded.

**PRESIDENT WILLS:** Technically that, of course, should go to the Resolutions Committee, but by suspension of the by-laws we can act upon it now. What do you wish to do with Mr. Felker's motion?

**DR. DYSON:** I move to suspend the by-laws and act upon it immediately.

The motion was seconded.

**PRESIDENT WILLS:** Mr. Felker's motion is that this association go on record as approving the resolution adopted by the Livestock Exchange in reference to the appropriation for carrying on the work in connection with the eradication of incurable diseases.

Mr. Felker's motion prevailed.

**DR. POTTER:** Mr. President, we have seen the technical men representing these various organizations coming here and asking the indulgence of this body to present certain resolutions. I believe it would be a good thing if this association would invite all the breeders' associations and other organizations representing the livestock industry, to send their representatives here annually as members of this association. I think it would greatly facilitate the work of this organization.

The motion was duly seconded.

**PRESIDENT WILLS:** The resolution proposed is that representatives of the breeders' associations be invited to send representatives to these gatherings.

Dr. Potter's motion prevailed.

**PRESIDENT WILLS:** We will now proceed to the election of officers, if there is no further new business.

**DR. STANGE:** Mr. President and gentlemen: I think that we all wish to continue men in the high offices of this association who are capable of doing constructive work. I wish to place before you for your consideration a man who in my estimation, has done some wonderful work in the past few years. He has taken hold of the situation in the South when matters, owing to very bad mismanagement, were in a deplorable condition. This man has not only been a practitioner, but he has been professional in every sense of the word. He has practically resurrected the professional standing of our brethren in his state. I wish to place in nomination Dr. Jacob, of Tennessee.

**DR. DUNPHY:** I rise to second the nomination of Dr. Jacob, in view of the fact that the South should be recognized in this association, and one that has done as much for the profession in his state as Dr. Jacobs has the last year or so, deserves recognition.

**DR. MOHLER:** Mr. President, I would like to place in nomination for the consideration of this assembly the name of a man from the far South. It is true that the South has not been represented in the presidency of this organization to my recollection more than twice, and it has been five or six years since the South has held that position.

We have heard at this meeting a great deal about tuberculosis and abortion, but we have heard very little about tick eradication. The great results that have been accomplished in the South along the lines of tick eradication must appeal to all of us as sanitarians. On the first day of December of this year there was released in southern territory 65,000 square miles. The leader of these southern states was Mississippi. Mississippi has done for the quarantine line what the allies have done for the von Hindenburg line. It has driven down the quarantine
line, extending clear to the Gulf of Mexico. For the first time the great state of Mississippi is entirely removed from the restrictions of the federal regulations.

In giving recognition to the great work that has been accomplished in Mississippi we are paying tribute not only to the state officials and the federal men at work in that particular community, but to ourselves as well. This is a tribute to the sanitation feature of this Association, and I take pleasure in placing in nomination the name of state veterinarian, Dr. Ranck.

**PRESIDENT WILLS:** Are there any other nominations? If not, we will proceed to ballot.

**DR. RANCK:** Mr. Chairman, I thank Dr. Mohler very much for Mississippi, for the courtesy which he has extended us, but as there are no further nominations for this office of presidency, I would like to withdraw my name and make this a unanimous vote for Dr. Jacob, of Tennessee.

**PRESIDENT WILLS:** Dr. Ranck having withdrawn, the chair will entertain a motion that the ballot be cast for Dr. Jacob.

On motion, duly seconded and carried, Secretary Ward cast the ballot of the Association for Dr. Jacob as president for the ensuing year.

**DR. JACOB:** Mr. Chairman and gentlemen, it is needless to say that I appreciate this. I appreciate it a great deal more than I am able to express. I have only one thing to say, and that is that I will do my best toward making an efficient officer for the association.

The following gentlemen were nominated for the office of Vice-President, and on motion, duly seconded and carried, Secretary Ward cast the ballot of the association for these gentlemen as Vice-Presidents for the ensuing year: Dr. Glover, Dr. L. H. Howard, Dr. W. F. Crewe, Dr. A. S. Cooley, and Dr. Frederick Torrance.

**PRESIDENT WILLS:** Nominations are now in order for Secretary-Treasurer.

**DR. DUNPHY:** I move that Dr. Ward be re-elected by acclamation.

The motion was duly seconded and carried.

**DR. RANCK:** I move that Mrs. Flaws, the present Assistant Secretary, be reappointed as Assistant Secretary of this association for the ensuing year, at a compensation of $100.

The motion prevailed.

**PRESIDENT WILLS:** Dr. Ranck and Dr. Dunphy will escort the President to the chair.

Dr. Ranck and Dr. Dunphy escorted President Jacob to the chair.

**PRESIDENT JACOB:** Outside of a few remarks from our newly elected Secretary-Treasurer, I think we are ready for adjournment.

**SECRETARY WARD:** Mr. President and gentlemen: In view of the high cost of living, I certainly appreciate your re-electing me to this office, where I have the opportunity of handling the funds. I thank you. (Applause.)

**PRESIDENT JACOB:** If there is no further business, we are now ready for adjournment.

On motion, duly seconded and carried, the convention adjourned *sine die*.
REPORT OF STATE LIVE STOCK SANITARY OFFICIALS.

Florida.

It gives me great pleasure to report that the live stock conditions in Florida are in excellent shape. Our state is comparatively free from the contagious and infectious diseases of live stock; our largest problems being the eradication of the cattle tick and the control of hog cholera.

We have an occasional case of glanders in the larger cities of the state, but as provision is made for the payment of animals condemned on this account, we have little or no difficulty in getting the cases reported. In all cases, after the diseased animals are disposed of, the premises are thoroughly cleaned and disinfected under the supervision of a representative of the State Live Stock Sanitary Board.

We have had a few cases of anthrax in cattle, but in every instance it has been confined to a very limited area, generally to the farm on which the first case appeared, and the losses have been very small. Blackleg has never, so far as our records show, appeared in Florida.

Prior to the first of last June, all live stock sanitation was under the control of the State Board of Health, and the active work was carried on by the state veterinarian, and two assistants, and only a very limited amount of funds was provided for the work.

Recognizing the large and rapidly increasing development of the live stock industry in the state, the Legislature of 1917 created the State Live Stock Sanitary Board, which is clothed with authority over all matters of live stock sanitation. Of this board the Commissioner of Agriculture is ex-officio president; the other members being the state treasurer, the state superintendent of public instruction and two members appointed by the governor. For the expenses and work of the board for the next two years, the Legislature appropriated the sum of $150,000.00. For the present fiscal year the board has set aside $35,000.00 for tick eradication work; $25,000.00 for hog cholera control work; and $15,000.00 for general expenses and the investigation and control of other live stock diseases. Under the provisions of the law, the state veterinarian is made executive officer and secretary of the board.

In view of the fact that Florida is the only state left with large areas of open range capable of the greatest development in beef cattle production, the board, in co-operation with the Federal Bureau of Animal Industry, has been particularly stressing the work of tick eradication. At the present we have 29 counties carrying on preliminary tick eradication work, with a state live stock inspector in each county, and the work is progressing as rapidly as it is possible to efficiently direct it. We now have three counties and a portion of a fourth county tick-free and released from quarantine. Next year we expect to have at least three and possibly more counties under systematic tick eradication work, which will be freed from ticks and released from quarantine by December 1, 1918, and in 1919, we expect to have twenty or more counties ready for systematic tick eradication work and release by December 1, 1919, and a tick-free state not later than 1921.

In this work we are having the heartiest co-operation of the Federal Bureau of Animal Industry and our success in the work is largely due to this fact.

In hog cholera work, we are working in co-operation with the Federal authorities and the State Experiment Station and are making excellent progress, though somewhat handicapped at the present time by the diffi-
Difficulty in securing competent veterinarians. Our general plan is to place a veterinarian in charge of the work in each of the six districts into which we have divided the state. These men are working with and through the Federal officials and the county demonstration agents.

On account of favorable climatic conditions, tuberculosis is not prevalent among our cattle; therefore, nothing has been done along these lines, except to prohibit the importation of cattle infected with this disease. To encourage the importation of better beef cattle from the western states, the tuberculin test is not required on this branded range stock.

The passage by the last Congress of the bill permitting the importation into ports, below the quarantine line, of cattle from Mexico, Central and South American States, has made the adoption of stringent regulations necessary, but as these cattle are only admitted for immediate slaughter, we anticipate no danger of the introduction of other contagious and infectious diseases.

Under the head of "General Administration," we will have one, and possibly two, veterinarians, who will devote their entire time to the investigation of diseases of live stock of a contagious and infectious nature.

In conclusion, I wish to call your attention to the many advantages which Florida offers for the profitable production of live stock, by reason of its climatic conditions, the possibility of growing an abundance of the best feed crops, year-round grazing, a plentiful supply of water in all sections of the state and the comparative freedom from the numerous diseases and other drawbacks prevalent in other sections of the United States; and as a last word: "Watch Florida grow as a live stock state, especially in the raising of cattle and hogs."

J. W. DeMilly,
Acting State Veterinarian.

Idaho.

By adhering strictly to the regulation demanding the mallein test for all horses entering the state, glanders has been much less prevalent than in former years, only five reactors having been found, and they were destroyed.

Sheep scabies broke out in the southeast part of the state and over 425,000 head of sheep have been dipped. All infected herds were dipped twice, and exposed herds once. It is expected that a general dipping order will be issued next spring and every sheep in the state will be dipped. The assistance rendered by the B. A. I. has been very valuable in this work.

Early in the year hog cholera made its appearance in the eastern part of the state but by strict quarantine regulations and the co-operation of the B. A. I. the disease is now entirely under control.

Blackleg made its appearance in several sections of the state, and upon orders from the live stock sanitary board all young cattle are now being vaccinated.

Tuberculosis is the most prevalent infectious disease with which we have to contend. Up to the present time tests have been made only where suspicious cases have been reported, but it is expected that all dairy and pure bred herds will be tested, beginning early in the spring.

H. G. Bodle,
State Veterinarian.
During the past year no serious or wide spread epizootics have existed among live stock in Iowa. On account of the extensive movement of horses and mules for war by our government and the allied nations we had feared there might be a pronounced increase in the numbers of outbreaks of glanders, but we are glad to report at this time that there has been practically no appreciable increase. Nearly 10,000 horses and mules have been consigned to the remount station at Camp Dodge, all of which have been mallein tested without a positive reaction. As these animals have come from a number of states I take it that the existence of glanders in the United States has decreased and that there is little cause for alarm on account of this disease.

Quite a number of outbreaks of hemorrhagic septicemia in cattle have been reported to this office. In some cases the infection is apparently traced to the stockyards in live stock centers. In other instances the outbreaks seemed to be due to the presence of the infection on certain farms and in certain fields. In most cases the research department of the Iowa State College at Ames has been notified and Dr. Chas. Murray has superintended the vaccination of the infected herds with apparently good results. On account of the percentage of soft or immature corn which tends to become moldy we expect more or less trouble in our live stock due to the feeding of this moldy corn. However, we are glad to report at this date that no unfavorable conditions prevail due to this cause.

Scabies has been found to exist in several flocks of sheep, practically all of which were shipped in from other states for breeding or feeding purposes. Our experience with this disease tends to prove that in all interstate movements of sheep for breeding or feeding purposes the sheep should be dipped to prevent continually carrying this disease from one state to another.

There have been a good many initial outbreaks of hog cholera in the state, doubtless due to the carrying over of infection on the premises. There have been numerous outbreaks in shipments of hogs supposedly immunized at the point of origin. Such shipments, however, were moved into the state of Iowa in violation of the animal health commission rule which requires that hogs receiving the simultaneous treatment shall not be shipped into the state of Iowa until thirty days after vaccination. Hogs shipped either seven or fourteen days after vaccination have developed cholera in transit or at destination. Our experience with import shipments of vaccinated hogs tends to prove that hogs receiving the simultaneous treatment should not be shipped for at least twenty-one days and that our original thirty-day period is preferable as a protection to our feeders and breeders. If hogs cannot be held thirty days before being shipped into Iowa we prefer to receive them from a cholera-free area in clean disinfected cars, fed and watered in transit without unloading, subject to vaccination and quarantine on the owner's premises at destination. Within the past three months we have admitted a great many carloads of hogs with the restrictions before named and up to this date we have had no reports of cholera in such shipments. The urgent demand for increased production of pork as well as the demand for increased numbers of hogs to consume our soft corn in the near future makes it our duty to do all that we can along these lines, at the same time seeking to prevent cholera outbreaks.

This department is doing all within its means to control tuberculosis. We continue to find a very high percentage of the hogs tuberculous.
On some farms and in some instances the cattle on the same premises are found to be tuberculous. When the government inspectors at the various abattoirs report the finding of tuberculosis in hogs or cattle shipped from Iowa investigation is made of the conditions on the premises where the shipments originated, the tuberculin test applied, and all cattle that react are isolated in quarantine until they can be shipped to an abattoir for slaughter under federal inspection. The barns and premises where the infection is found are cleaned and disinfected under directions of a representative of this department.

A number of Iowa breeders of pure-bred cattle are now ready to have their herds placed on the accredited list, and we propose to begin this work in co-operation with federal authorities. There is urgent need for uniform regulations for the establishment of accredited herds in all of the states and we believe such regulations should be formulated by the federal authorities and agreed to by the various state departments in order that this very important work may be carried on in a safe and uniform way.

J. I. Gibson,
Executive Officer, Annual Health Commission.

Kansas

We have had no serious epizootics in Kansas during the current year. As has been the case in past years, our greatest financial loss in the state on account of disease among the live stock, has been through the widely scattered infection of hog cholera. However we have made much progress in the control of this disease by organizing county control units, and conducting intensive educational campaigns in twenty-five counties in which hog raising is of great importance. We have endeavored to show that good sanitary methods in handling live stock are invaluable and of primary importance in controlling all live stock diseases. We have also demonstrated the value of properly treating infections of hog cholera.

We have tested far more breeding and dairy cattle for tuberculosis in our state during the past year than during any previous year. We have tested over 125,000 head, and a fraction over 1 per cent of tested animals have reacted. In a goodly number of cases the infection can be traced to animals which have been shipped into Kansas from some of the eastern dairy states. We are encouraging dairymen and breeders to keep their herds tested, and have adopted a blue book system whereby properly tested herds may be recorded. This system is of great advantage to stockmen, as well as a convenience to our department.

Kansas has again taken a step forward in the discovery of a new method of treating animals infected with blackleg, as well as immunizing cattle. This treatment consists of a serum and germ-free filtrate. The germ-free filtrate is rapidly being adopted as the most practical method of immunizing calves by most cattle raisers throughout the great Southwest. This treatment has the great advantage of practically immunizing for life. On account of the general use of this treatment in Kansas, we have had less loss among young cattle than ever before.

Scabies among cattle, which in former years was very common in the western half of our state, is very rare at present. We have had only a few slight infections in the state during the past year.

This seems to be one of the years when it is dangerous to feed cattle in corn stalk fields. In certain districts in Kansas where the stalks are stunted and immature, a number of farmers have lost cattle
after turning them into the stalk fields. It is our opinion that the extended drouth during the past six months has been responsible for this condition, which is likely a fungus poisoning.

Glanders has practically been eliminated—only three cases having been brought to our notice during the year.

There has been only one outbreak of rabies. Several dogs and three cattle were destroyed after typical symptoms developed. Our method of quarantining a six-mile-square area proved successful in stamping out the infection.

With a few possible exceptions Kansas, throughout 1917, has been practically free from other infections peculiar to live stock. Taking into consideration the extreme drouth during the past six months, and the fact that the movement of live stock into Kansas has been greater than ever, it is with pleasure that I am able to report the loss among the live stock in Kansas to have been much below the average of the past few years.

J. H. MERCER,
Live Stock Commissioner.

Kentucky

Hog cholera has been less prevalent during 1917 than in any year since 1908. The reasons for this are twofold: (1) decrease in the number of hogs raised and fed, (2) marked increase in the use of the serum preventive treatments following co-operative educational and demonstrational work throughout the state.

Co-operative intensive hog-cholera control work has been a complete success in three counties. This work did not extend to other counties because of our limited forces and funds. After our entrance into the world war and the shortage of pork and pork products had been determined and the necessity for the conservation of these food-producing animals was so clearly shown us, it was deemed advisable to change our mode of operations from the intensive control work to state-wide educational and demonstrational work, sending the representatives of the co-operative agencies into all portions of the state from which outbreaks of hog cholera were reported, and in which no satisfactory progress in its control could be accomplished by the local veterinarians. The results obtained in the work have more than justified the change, as our records will show that a great number of hogs have been saved, thereby increasing the pork supply, when without our assistance at least 90 per cent of the hogs treated would have died. Dealers have gone to many states to purchase animals to supply the increased demands and have in some instances purchased tuberculous animals. Unfortunately, we have no available funds with which to reimburse owners for the slaughter of known tuberculous cattle, but we have made some progress in the disposition of these reactors by gaining the consent of the owners to have them slaughtered at a packing house under Bureau supervision where they can secure the market price for all portions of the carcass not condemned. This is by far the most satisfactory way we have in this state of disposing of tuberculous cattle, as by law we can only quarantine such animals.

Many outbreaks of hemorrhagic septicemia have been reported, with the death rate quite heavy. Most of these outbreaks occurred in herds which were brought into the state from some of the public stock yards, or in native herds to which a number of newly purchased animals had been added. The vaccinations were used both as curative and preventive
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treatments with satisfactory results. As this disease seems to be more prevalent each year, it is my opinion that more thorough inspections should be made by Bureau inspectors in the different yards and that our work will be carried on in this manner until a better plan is shown us.

Heavier losses from blackleg have been reported during this year than during any year of which I have record. The death rate has been very high, due mainly to the fact that our most serious outbreaks occurred in territory in which no experienced veterinarian resided, and where owners had had no previous experience or instructions as to the sanitary precautions to be taken. Prompt vaccination of all exposed, susceptible animals has checked the spread of the disease in practically every instance, but I fear further outbreaks in this territory during the coming season because of the indifference of many owners to the proper disposition of carcasses.

On account of the increased number of reactors during the past year, I believe that tuberculosis is slightly more prevalent than in any previous year. The increased interstate traffic in dairy animals is, I believe, in a great measure responsible for this. The dairy interests in this state are rapidly growing and our yards known or believed to be infected should be cleaned and disinfected at shorter intervals.

In April of this year a hurry call came to us from Webster County, requesting immediate assistance as a strange fly had attacked a herd of mules, killing 25 within twenty-four hours. An assistant state veterinarian was sent to make an investigation, and upon his arrival the next day he was pleased to find that the flies had left as quickly as they had come, but determined from the information given him that the deaths were due to the bite of the "Buffalo gnat." This is our first visitation from this gnat, and I trust our last.

A few more flocks infested with scab have been found during this year than in the previous, but at present we believe that little, if any, scab exists in the state, as all known infested and exposed flocks have been dipped and reported clean.

In October of this year some traders who own farms on the Kentucky-Tennessee line in Fulton county, Kentucky, and Obion county, Tennessee, brought to these farms from other points in Tennessee a number of cattle for feeding purposes. A few of these were ready for market and were shipped to the National Stock Yards, where upon arrival they were found to be infested with ticks. We were notified by letter by the inspector in charge, and we immediately instructed the county live stock inspector of Fulton county, Kentucky, to co-operate with both Bureau and Tennessee officials in locating all exposed animals. These officials co-operating made numerous investigations and found that the disease had not spread from the original herds. Only three infected animals were found on one farm and two on the other, making in all five infested and thirteen exposed. The premises and animals were placed under quarantine and held so until the animals had been sprayed three times and pronounced free. There were no deaths.

S. F. MUSSELMAN,
State Veterinarian.

Respecting new legislation a state-wide compulsory tick eradication act was passed at a special session of the General Assembly in July. This means that the entire state, or those parishes now in quarantine, will be worked next season. Thirteen parishes are now clean and released from quarantine.
Anthrax has been extremely prevalent during the past season, due to climatic conditions which have been favorable for its development. In thirty-eight parishes the disease occurred to a greater or lesser extent, the losses in some instances being large. Excellent results have been obtained in combating anthrax this season with the simultaneous treatment, or with the anti-anthrax serum and spore vaccine method. Results following this vaccination among cattle, especially, have been very gratifying.

Hog cholera has been prevalent throughout the state in various sections, probably twenty per cent more than the previous year. Our state serum plant, under the supervision of the live stock board, manufactured and distributed to swine owners of the state, at actual cost, during the past year, 3,500,000 cubic centimeters of serum.

Three outbreaks of hemorrhagic septicemia were reported and investigated.

Three cases of glanders have been destroyed during the past year. So far as we know, at this time, there is no glanders in the state.

Live stock conditions on the whole are showing extremely greater progress than has ever been made before.

E. Pegram Flower,
Secretary and Executive Officer.

Nevada

Rabies entered the state early in 1915. Suppression measures are being conducted by the United States Biological Survey with the co-operation of the State Rabies Commission at a cost of approximately $6,500 per month.

Its absolute control is impossible on account of physical and geographical conditions, but its spread and the baneful consequences to the live stock industry are being perceptibly curtailed by the systematic hunting, trapping and poisoning of the virus-disseminating wild animals. The menace of this disease will persist for years, as eradication is virtually unattainable.

Anthrax is endemic in some localities. In these well-defined areas, annual vaccination by the Pasteur or Sobernheim methods has eliminated all appreciable losses. In one small area, where there have been sporadic cases at times and in which annual immunization has been discontinued or never practiced, the losses this year were considerable in spite of prompt vaccination at the outbreak of the disease.

Hemorrhagic septicemia among cattle is our most serious disease problem. It has long been confused with anthrax by cattle owners. Its identity has not yet been fully established. Clinically and pathologically it appears to be hemorrhagic septicemia; bacteriologically and serologically it fails to meet the requirements for such identification. Vaccination with mixed strains of Bact. bovisepeticum and therapeutic treatment with the specific serum obtained by the hyper-immunization of horses yield encouraging results.

Infectious bovine abortion is seldom reported among the range cattle. At present it is confined almost exclusively to the dairying sections, especially where recent importations have been heaviest. Present traffic and cattle conditions coupled with our lack of reliable methods of control preclude any activity in its suppression.

No intrastate regulation of bovine tuberculosis is practiced. Cattle owners are advised to rid their herds of the disease. The state co-operates with owners desirous of obtaining and maintaining tuberculosis free
herds, testing without cost on the condition that they dispose of reactors for slaughter under federal meat inspection. From tests so far made it would appear that the percentage of tuberculous animals is small.

Blackleg is endemic over considerable areas. Immunization by annual or semi-annual vaccination as practiced by stockmen and veterinarians has proved very satisfactory.

Periodic recrudescences of hog cholera in old areas of infection occur. There have been no new foci during the year. Simultaneous (sero-virus) treatment and restriction of movement of hogs have invariably suppressed its extension.

Recently we have encountered a few flocks of scabies-infected sheep. Necrobacillosis is persistent in widely scattered herds. Usually it is of benign type, but in some instances it has caused considerable mortality, especially when both feet and lips are affected. It is also seen as an involvement of the genitals especially among the bucks and as such entails considerable loss.

Occasionally we have deaths of a limited number of sheep from a "hemorrhagic-septicemic" type of disease. This, as opportunity offers, is receiving our attention.

Epitheliosis and cholera among turkeys and chickens are widespread. Outbreaks of these diseases are usually suppressed with reasonable success by vaccination.

Coccidiosis among turkeys caused heavy losses on the Truckee Carson Project during the spring and summer. In most flocks the owners attempted no treatment. In a few cases success followed the administration of intestinal antiseptics along with rigid clean-up methods, thereby excluding heavy reinfection.

W. B. MACK,
State Quarantine Officer.

New York

Conditions in the State of New York during the past year in regard to live stock, emphasize the importance of more attention to the conservation of animal life and to increasing the production of the individual animal. There have been no particular epidemics of disease affecting domestic live stock.

The number of dairy cattle in the state has decreased quite alarmingly in the past few years. The market for high grade dairy animals is exceptionally good and it is possible that this may in time encourage cattle owners to increase their animal production and perhaps in time replace the large number of animals that have been disposed of because of the high cost of feed and scarcity of labor.

Efforts have been made to encourage the sheep industry by the importation of considerable numbers of sheep from the West, and results have been quite encouraging. There has likewise been some effort to increase the number of beef producing animals and utilize waste pasture by shipment of breeding heifers and steers from Texas and elsewhere.

Losses from anthrax, blackleg and tuberculosis seem to have been about the same as heretofore. Losses from contagious abortion are becoming as serious as any with which we have to contend. Efforts looking toward the control of this serious malady are not encouraging. An appropriation has been made by the state to be used in the study of this disease and it is hoped that something material will result.

The statistical information available indicates that an increasingly
larger number of cattle are being tuberculin tested yearly and that the
percentage of diseased animals shows little variation, although the num-er of advanced cases of the disease is slightly decreasing. The number
of equine animals destroyed for glanders shows a decrease from the past
and a much larger number of animals are being mallein tested or other-
wise examined for this disease annually. It is possible that the decrease
may in part be due to the reduction in the number of equine animals in
the cities due to the encroachment of the motor truck. Rabies shows
a decrease from that of the past year while the other contagious dis-
eases show approximately the same extent as in the past. It is believed
that the more systematic supervision over these infections and the closer
attention of owners and practicing veterinarians to these outbreaks are
having an appreciable effect in reducing their ravages.

J. G. WILLS,
Chief Veterinarian, State Board of Agriculture.

North Dakota

The condition of the live stock in this state as to communicable dis-
eases has been quite satisfactory.
The number of animals destroyed for glanders (273) was somewhat
less than for the previous year.
The indemnity for horses destroyed for glanders has been increased
from $50.00 to $75.00. Fifty-three horses reacted to the complement-
fixation test and were destroyed. It is believed that this disease is prac-
tically eradicated.
In all, 15,084 cattle were admitted by the tuberculin test; 21,164 feed-
ing cattle were admitted by physical health certificate; 10,536 breeding
cattle remaining within the state were tuberculin tested, 518 reacting to
the test. Of these cattle, 4,283 were pure bred.
We have 123 herds of pure-bred cattle in the state certified free herd
class.
Regulations were established requiring a retest after a period of not
less than sixty days, of all pure-bred cattle imported into this state.
Fifty-two head of cattle have reacted to the retest.
Some herds of cattle where contagious abortion existed were tested
for this disease. Out of 168 tested, 71 were positive, 12 suspicious, and
85 negative.
Two herds have been injected according to the Stockman treatment,
but it is too early to report results.
The state has been practically free from hog cholera during the past
year.

W. F. CREWE,
State Veterinarian.

Pennsylvania

There has been no noticeable change in live stock sanitary conditions
during the past year.
The slight increased percentage of reactors to the tuberculin test this
year and last over 1915 is due, we believe, to the improved methods of
testing rather than to the increase of tuberculosis. The results of the
comparative tests for tuberculosis referred to last year were reported
at this year's meeting of the American Veterinary Medical Association
at Kansas City, and will be published in the Journal of the American
Veterinary Medical Association, also in bulletin form.
Our meat hygiene law has been strengthened by an amendment which
makes it unlawful to expose meat so that it may be touched or handled by prospective purchasers or other unauthorized persons; also to expose meat to insects, etc. It furthermore broadens the term "meat" and "meat products," as defined in the old act, to include the carcasses of horses, mules and goats.

Less rabies has been reported than for a number of years. It is believed that the enforcement of the new dog law is largely responsible for the decrease in this disease.

Very little, if any, change has been observed with reference to the prevalence of the other dangerous transmissible diseases, such as hog cholera, glanders, anthrax, blackleg, hemorrhagic septicemia, etc.

The results obtained in treating cows for sterility have been gratifying and it is planned to continue this important work next year.

The board has recently taken charge of the livestock, with reference to dangerous transmissible diseases, at the state institutions, and much good is expected to come from this arrangement.

During the ten years in which our stallion registration laws have been in effect there has been a decided increase in the registration of pure-bred stallions and a decrease in the grades.

In our last report we ventured the prediction that the incoming legislature would enact an adequate milk hygiene law. Unfortunately, the proposed legislation was not passed.

Report of dairymen sacrificing their herds to butchers was found to have been somewhat exaggerated. The dairy cow population continued about normal with an ample supply of milk to meet demands. There is a lessened demand by some condensaries, as their foreign markets have been restricted by the federal food embargo covering certain neutral European countries.

An extensive dealer in livestock was convicted on charges of selling at public auction hogs which were affected with hog cholera. The action was brought under a section of the livestock law of 1913 which makes it unlawful to sell, offer for sale, give away, or allow to stray any animal affected with a dangerous transmissible disease. The trial, which was without precedent in this state, created considerable interest among livestock owners and dealers.

T. E. Munce,
Acting State Veterinarian.

Wisconsin

During the fiscal year of 1916–17 there were 78,197 head of cattle tested for tuberculosis with 3.6 per cent reacting. Of these, 2,294 head were killed for which the state paid an indemnity of $114,189.16. The state received as salvage from these animals $67,825.46.

The 1917 session of the legislature adopted sweeping changes in the matter of indemnity and the general care and disposition of reactors. Indemnity was raised to a maximum valuation of $200. The basis of payment was placed at one-half of the appraised value. Provision was also made that the milk from reactors might be used for commercial purposes providing that the reactors show no evidence of physical lesions and the milk is disposed of to some public institution maintaining a satisfactory system of pasteurization. This provision was not made with a view of encouraging the keeping of a few reactors on premises where a clean herd is maintained. It was mainly with a view of protecting the breeder who might suffer the loss of the greater part of his herd and providing a means of assuring him that the entire herd need not
be removed immediately in case of such a catastrophe. Second, this provision is for the purpose of encouraging the placing of valuable reactors on quarantine premises for the saving of the progeny. These plans are working out satisfactorily and will be better when the people become more adapted to this view, and the indications are that a larger number of breeders will take more kindly to the testing.

Twenty-six horses were slaughtered after reacting to the mallein test. Glanders in the state of Wisconsin is a negligible quantity.

Several severe outbreaks of hemorrhagic septicemia have taken place in Wisconsin during the last year. While part of this is from the so-called sporadic outbreaks the majority of cases have been found among that class of stock known as feeders which have been handled through various stock-yards. The greater part of these animals have taken on the pneumonia form.

Hog cholera has not appeared in this state to any extent up to the present time. Only one definite outbreak has occurred and that district has been patrolled by our field men and was soon under control. A special appropriation of $2,000, annually, has been made for hog-cholera supervision.

The approximate number of pure-bred breeders in the state is 5,000. The total number of cattle in Wisconsin is 63,617,000, of which 28,768,000 are milch cattle. The total number of horses is 21,126,000; sheep 48,483,000; and hogs 67,453,000.

O. H. Eliason, State Veterinarian.


The numbers of live stock in Canada show a slight increase compared with ante-bellum figures, as shown by the following table:

<table>
<thead>
<tr>
<th>Live Stock</th>
<th>1912</th>
<th>1913</th>
<th>1914</th>
<th>1915</th>
<th>1916</th>
<th>1917</th>
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<tr>
<td>Horses</td>
<td>2,692,357</td>
<td>2,866,008</td>
<td>2,947,738</td>
<td>2,996,099</td>
<td>3,258,342</td>
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<tr>
<td>Milch cows</td>
<td>2,604,488</td>
<td>2,740,434</td>
<td>2,673,286</td>
<td>2,666,846</td>
<td>2,833,433</td>
<td>3,202,283</td>
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<tr>
<td>Other cattle</td>
<td>3,827,373</td>
<td>3,915,687</td>
<td>3,363,531</td>
<td>3,399,155</td>
<td>3,760,718</td>
<td>4,718,657</td>
</tr>
<tr>
<td>Total cattle</td>
<td>6,431,861</td>
<td>6,656,121</td>
<td>6,036,817</td>
<td>6,066,001</td>
<td>6,594,131</td>
<td>7,920,940</td>
</tr>
<tr>
<td>Sheep</td>
<td>2,082,381</td>
<td>2,128,531</td>
<td>2,058,045</td>
<td>2,038,662</td>
<td>2,022,941</td>
<td>2,369,358</td>
</tr>
<tr>
<td>Swine</td>
<td>3,477,310</td>
<td>3,448,326</td>
<td>3,434,261</td>
<td>3,111,900</td>
<td>3,474,840</td>
<td>3,619,382</td>
</tr>
</tbody>
</table>

The health of Canadian live stock has been and is at the present time satisfactory, especially with regard to contagious diseases.

Glanders was confined almost entirely to the Province of Saskatchewan, in which 157 cases have been slaughtered. One case was found in Quebec and seven in Alberta, making a total for all Canada of 165 cases.

Hog cholera has appeared in various parts of Canada in isolated outbreaks, originating in almost every case from garbage feeding. Prompt measures stamped out each outbreak before it attained large dimensions, the total loss in all Canada amounting to 1,162 swine.

Dourine has been confined to a small area in the southern part of Alberta, and is apparently nearly extinguished, only five cases being found during the year. We are making a practice of testing all stallions in Southern Alberta and will continue this practice until fairly certain that the disease is suppressed. So far, 1,953 complement fixation tests have been made.

We can report progress and improved prospects for the future in
dealing with tuberculosis. The testing of dairy herds supplying raw milk to cities and towns is extending, and we hope eventually to reach a point where all raw milk sold in cities or towns in Canada will be derived from herds free from tuberculosis and under a regular system of taxation. Our experience reveals that this class of cattle in Canada is affected with tuberculosis to the extent of 6 to 7 per cent. Tuberculosis of swine is on the increase. We are endeavoring to have a law enacted requiring the sterilization of by-products of creameries and cheese factories as a means of removing this source of infection, but so far we have been unable to overcome the inertia of parties interested in the cheese and butter trades.

A small number of accredited herds are under our supervision, and we would like to extend this work to take in all pure-bred breeders. So far we have failed to convince owners that it is to their interest, and prospects for its wide adoption do not appear bright.

Contagious abortion is causing unknown losses and is widely disseminated. We are treating a limited number of herds by the method of immunizing heifers before breeding and are meeting with a fair measure of success, but will have to wait some time longer before announcing results.

Other diseases such as anthrax, hemorrhagic septicemia, blackleg and shipping fever are existant to a limited extent and are handled by methods too well known to be repeated here. We have no sheep scab in Canada at present. Cattle mange is confined to a restricted area in Southern Alberta and the adjoining province of Saskatchewan. It is gradually becoming stamped out by a system of dipping and would have been eradicated some time ago, but for the difficulty inherent in a range country of making a clean round up of all the cattle. A few stragglers may easily be left to escape the dipping vat and perpetuate the disease.

Increased production of live stock in Canada is to be expected as a result of the high prices to be obtained and also from the efforts put forth to stimulate the industry through a campaign of education. The Canadian press, and especially the agricultural press, are advising the farmers to increase live stock production not only for the large profits that may be expected but from the necessity of feeding our troops and our allies. Public meetings are held in rural districts and popular speakers arouse the interest of the farmers along these lines and we are hoping for a largely increased production, especially of hogs.

F. Torrance,
Veterinary Director General.
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Brown, L. F., Galesburg, Ill.
Brown, W. R., El Paso, Texas
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Buckley, Samuel S., College Park, Md.
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Ensign, E. D., Bryan, Ohio
Erickson, O., Pelican Rapids, Minn.
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Evvard, John M., Ames, Iowa
Faust, Otto, Poughkeepsie, N. Y.
Feeley, R. O., Clemson College, S. C.
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Ferguson, John J., Chicago, Ill.
Ferguson, T. H., Lake Geneva, Wis.
Fesler, J. R., Bushnell, Colo.
Fischer, Paul, Reynoldsburg, Ohio
Fielden, Henry, Byron, Ill.
Fisk, A. G., Trinidad, Colo.
Fitch, Clifford P., St. Paul, Minn.
Flocken, Chas. F., St. Anthony Park, Minn.
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Flowe, H. P., Raleigh, N. C.
Flower, E. Pegram, Baton Rouge, La.
Fox, F. C., Amarillo, Tex.
French, A. W., Cheyenne, Wyo.
French, W. H., Redfield, S. D.

Garr, E. S., LaGrange, Ky.
Gandy, M. H., Baton Rouge, La.

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Gibson, J. E., Indianapolis, Ind.
Gibson, J. I., Des Moines, Iowa
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Goebel, C. H., Kansas City, Mo.
Goss, L. W., Manhattan, Kan.
Glover, E. K., Kansas City, Mo.
Gow, R. M., Little Rock, Ark.
Graham, Ralph, Sedalia, Mo.
Graham, Robt., Lexington, Ky.
Greeder, Herman, Janesville, Wis.
Grimes, Robt. B., Kansas City, Kan.
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Gustafson, S. L., Searcy, Ark.

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Hawkins, Frank V., Indianapolis, Ind.
Hawkins, J. D., Natl. Stock Yards, Ill.
Hays, Clark H., Indianapolis, Ind.
Hecker, Frank, Birmingham, Ala.
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Henderson, J. S., Collierville, Tenn.
Henry, Ed. R., Forth Worth, Texas
Hernshein, J. T., Chicago, Ill.
Herring, C. T., Amarillo, Texas
Hershey, S. E., Charleston, W. Va.
Hess, O. B., Washington, D. C.
Hickman, R. W., Washington, D. C.
Hildebrand, A. L., Atlanta, Ga.
Himmelberger, L. R., Fort Dodge, Iowa

Hollingworth, W. G., Utica, N. Y.
Hoffman, Wm., Kansas City, Kan.
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<thead>
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<th>Name</th>
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<tr>
<td>Hoggan, R. W.</td>
<td>Salt Lake City, Utah</td>
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