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

HOTEL LASALLE, CHICAGO, ILL
December 3-5, 1924
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UNITED STATES LIVE STOCK SANITARY ASSOCIATION

PRESIDENT
Dr. J. H. McNeil, Trenton, N. J.

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Dr. John R. Mohler, Washington, D. C. Dr. W. J. Butler, Helena, Montana.

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Dr. H. C. Kernkamp, St. Paul, Minn. Dr. Henry W. Turner, Harrisburg, Pa.

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Dr. W. F. Crewe, Bismark, N. D. Dr. C. E. Cotton, St. Paul, Minn.
Dr. J. A. Kiernan, Washington, D. C. Dr. S. E. Bruner, Harrisburg, Pa.

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Dr. E. C. Schroeder, Bethesda, Md. Dr. John M. Buck, Washington, D. C.
Dr. M. F. Barnes, Philadelphia, Pa. Dr. E. M. Pickens, College Park, Md.

DISEASES OF POULTRY
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Dr. V. A. Moore, Ithaca, N. Y. Dr. W. R. Hinshaw, Manhattan, Kan.
Dr. E. L. Stubbs, Philadelphia, Pa. Dr. M. A. Jull, Washington, D. C.
Dr. Selvert Eriksen, Mountain Grove, Mo.
Dr. F. R. Beaudette, New Brunswick, N. J.

SWINE DISEASES
Dr. C. H. Stange, Chairman, Ames, Iowa.
Dr. M. Dorsett, Washington, D. C. Dr. R. R. Birch, Ithaca, N. Y.
Dr. H. J. Shore, Ft. Dodge, Iowa. Dr. C. H. Hayes, Lincoln, Nebraska.
Dr. E. A. Cahill, Indianapolis, Ind. Dr. A. Eichhorn, Perle River, N. Y.

DISEASES OF LIVE STOCK
Dr. D. H. Udall, Chairman, Ithaca, N. Y.
Dr. R. R. Dykstra, Manhattan, Kan. Dr. W. L. Boyd, St. Paul, Minn.
SPECIAL SKIN DISEASES

Dr. C. G. Lamb, Chairman, Denver, Colorado.
Dr. A. W. French, Cheyenne, Wyo.  Dr. Leon C. Cloud, Ft. Worth, Texas.
Dr. L. C. Pelton, Olympia, Wash.  Dr. A. J. Webb, Salt Lake City, Utah.

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Dr. U. G. Houck, Chairman, Washington, D. C.
Dr. W. F. Crewe, Bismark, N. D.  Dr. Fred Zimmer, Columbus, Ohio.
Dr. Wm. Moore, Raleigh, N. C.  Dr. H. A. Wilson, Jefferson City, Mo.
Dr. J. P. Iverson, Sacramento, Cal.  Dr. Geo. E. Corwin, Hartford, Conn.

TICK ERADICATION

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Dr. J. H. Bux, Little Rock, Ark.  Dr. R. A. Ramsey, Washington, D. C.
Dr. C. A. Cary, Auburn, Ala.  Dr. E. Pegram Flower, Baton Rouge, La.
Dr. W. K. Lewis, Columbia, S. C.  Dr. J. V. Knapp, Tallahassee, Fla.

LEGISLATION

Mr. A. J. Glover, Ft. Atkinson, Wis.  Dr. John R. Mohler, Washington, D. C.
Mr. H. J. Henry, Albany, N. Y.  Mr. Jas. M. Whittlesey, Hartford, Conn.
Dr. R. C. Julien, Indianapolis, Ind.  Mr. M. Thornberg, Des Moines, Iowa.

FOOT AND MOUTH DISEASE

Dr. A. W. Miller, Chairman, Washington, D. C.
Dr. L. J. Howard, Boston, Mass.  Dr. George R. Hart, Berkeley, Cal.
Dr. E. S. Bayard, Pittsburgh, Pa.  Dr. J. P. Iverson, Sacramento, Cal.
Mr. J. Boog-Scott, Ft. Worth, Tex.  Dr. R. C. Reed, Baltimore, Md.
Dr. S. E. Bennett, Chicago, Ill.  Dr. Benj. J. Killham, Lansing, Mich.
Dr. A. W. Smith, Concord, N. H.  Dr. Edw. Record, Reno, Nevada.
Dr. George H. Hilton, Ottawa, Canada.  Dr. W. R. Smith, Boise, Idaho.
WEDNESDAY MORNING SESSION

December 3, 1924

The First Session of the Twenty-Eighth Annual Meeting of The United States Live Stock Sanitary Association, held at the Hotel LaSalle, Chicago, Illinois, December 3-5, 1924, convened at 10:30 o'clock, President J. G. Ferneyhough presiding.

PRESIDENT FERNEYHOUGH: Gentlemen, the Twenty-Eighth Annual Convention of The United States Live Stock Sanitary Association will now please come to order.

According to our program, our session will be opened this morning by memorial exercises conducted by Dr. J. I. Gibson and Dr. N. S. Mayo. (Applause.)

DR. J. I. GIBSON: Ladies and Gentlemen—I deem it fitting that we should pause a moment this morning to recount our losses, because in the midst of life we are always in death. We have met with some losses during the past year, and we will, for a few minutes, review the lives of those members. To open these exercises I will call on Marion Gibson Mason to sing for us, and Mrs. Wentworth to be the accompanist.

(Singing of "My Peace I Give Unto You," by Marion Gibson Mason.)

DR. GIBSON: I will now call upon Dr. N. S. Mayo to read the list of the deceased and pronounce the eulogy.

DR. N. S. MAYO: It is a difficult matter to fittingly express the sentiments on such an engagement as this, but the sorrow, the regrets and the heartaches of our losses shall go unexpressed.
Mine shall be but words of cheer, as I believe those who have gone
would desire. We, sometimes, are inclined to measure a human life by
the lapse of years and yet we live in deeds not year. We should count
time by heart thobs.

In pausing today to pay a tribute to the memory of our members
who have preceded us across that mystic river into the Great Beyond,
if we can draw some lessons from their lives that shall be helpful to
us in making the world brighter and better, I think, we shall be well
repaid.

During the past year four of our members have left us.

Dr. G. W. Dumphy of Lansing, Michigan. I happened to know Dr.
Dumphy well for many years. He was a practitioner at Quincy, Michi-
gan, and like many of the older veterinarians he chose the profession
because of his great love for horses. In the vicinity of Quincy, years
ago, was a well known horse raising region in Michigan, and Dr. Dumphy
was a leader in the horse industry in this community. Later he took
an active part in farmers' institute work in the State of Michigan. Later
he became State Veterinarian of Michigan and was known as a man of
rare good judgment, tact and good fellowship. After a long illness, he
passed away on the 10th of last December. You know what he was
because you honored him with the highest honor that this Association
can confer. He was former President.

Dr. Olen Moore, of Clayton, Illinois, died on the 26th of May. Dr.
Moore was (if one could use such an expression) a family veterinarian.
He was born and raised in that community. He spent his whole life
there. He was formerly Assistant State Veterinarian and a man who
commanded the respect of his whole community. Sometimes, we are
inclined to go into other fields, to long for other worlds in which to
make our effort in life. He chose his in his home community.

Dr. Fred Torrance, of Guelp, Canada, died on the 29th of June. You
all know Dr. Torrance and the distinguished service he rendered to live
stock sanitary work. He was formerly Veterinarian Director General of
Canada, and I am sure, if he had had the fortune, or misfortune, to have
been on this side of the imaginary line that marks the activities, in a way,
of this Association, he would probably have been honored as only this
Association could honor him, with the presidency, because he was an
outstanding man in live stock sanitary work, a man of rare good judg-
ment and few words.

Last is the name of Dr. John H. Blattenburg.

(Dr. Gibson read the obituary notice and "The Gospel of a Smile"
as a tribute to Dr. Blattenburg.)

Dr. John Blattenberg was an apostle of that gospel. When I first
heard of the death of Dr. Blattenberg I said with sadness: "Lima has
lost the priceless jewel of his sunny disposition, his optimism and his
smile."

And then, in spite of my sadness, I found my countenance suffused
with a smile as I remembered the jocular disposition, the ready wit and
the wholesome philosophy of John Blattenberg, as he lived among his fellowmen.

Then I knew that Lima had not lost the Blattenberg smile—that it will never lose it, for that matter—for a smile, such as this noble man dispensed, can never die.

His smile was the acme of democracy. Not a perfunctory smile for his closest friends, but a benign countenance for every living human being. None too lowly to invite it, none so lofty that they could subdue it.

It was effervescent, sparkling, irrepressible, like old wine.

It was satisfying, genuine, sincere, like the warmth of a radiant fireside.

It was solacing, sympathetic, comforting, like the arm of a friend.

Even the lowly animals came to know it and trust it, and those who were his closest friends could cash John Blattenberg's smile for its full face value, for back of each smile was that genuine spirit of integrity that guaranteed it, with interest.

DR. MAYO: I would say the quotation was from the home paper in Lima.

DR. GIBSON: The following resolution is offered:

"WHEREAS, God in His wisdom has, during the past year, called to their final reward our active members, Drs. Geo. W. Dumphy, Olen Moore, Fred Torrance and John Blattenburg; be it

"RESOLVED, That we hereby express our sorrow at the loss of their valued services and genial companionship and that we extend to their bereaved families our sincere sympathy; and be it also

"RESOLVED, That these resolutions be spread upon the minutes of this Association and that a copy be sent to the families of our departed members."

I move the adoption of the resolution.

(The motion was regularly seconded and carried unanimously.)

DR. MAYO: I would like to offer the following resolution:

"WHEREAS, Death has removed Hon. Henry C. Wallace, Secretary of Agriculture, a leader in promoting the development of agriculture and the livestock industry of the United States, and an active supporter of the ideals and work of this Association; therefore, be it

"RESOLVED, That we hereby express our sorrow at the great loss sustained by his death and that this resolution be spread upon the minutes, and a copy he sent to the family of the deceased."

Mr. President, I move the adoption of the resolution.

(The motion was regularly seconded and unanimously carried.)

DR. GIBSON: I will now call upon Mrs. Mason to sing.
(Singing of "He Is Not Dead, He Is Just Away," by Mrs. Mason.)

DR. GIBSON: In concluding these exercises I wish to mention two of the wives of members who are deceased: Mrs. L. H. Howard of Massachusetts, and Mrs. D. S. White of Ohio.

As an Association we tender our heartfelt sympathy with reference to the loss of these two estimable ladies.

Mr. President, this concludes the memorial exercises.

PRESIDENT FERNEYHOUGH: We were very much impressed at the exercises that have just been concluded. Personally, I wish to say I was very much touched. It does me good to know and realize the real fellow feeling that we have for each other in this organization, and it certainly was very cleverly demonstrated here this morning.

You know, however, I cannot keep on the solemn side of life. If I did, I am afraid they wouldn't recognize me. When I came to Chicago yesterday morning I had the pleasure of coming up from the depot with my good friend, Dr. Dyson. Everything looked kind of cold and chilly and strange until I got in the hotel here, and all of a sudden I heard a very familiar voice I recognized and it made me feel at home.

It reminded me very much of the colored fellow who left Virginia once and went to New York. He had been raised on my father's plantation. The Southern Railroad happened to run through later, and a little strip of land that father gave him turned out to be very valuable. In fact the darkey became wealthier than any of us. He sold the land. Some smart New York people got hold of him, and he told us he was going to New York to make a fortune. He went up to New York, and very unwisely he let the people know he had some money in his pocket. They got him dressed up in an evening suit and got him up there. In some mysterious way somebody else got hold of the money that evening.

They were going to make him at home and make him a gentleman. He got hold of several cards for different clubs. The next morning he found himself absolutely broke. He went out to visit homes. The first home he got to, he went up and rang the door bell. He had the evening suit on. The party who answered said Mr. So-and-so wasn't home. He had this experience at about three doors.

Finally, he happened, purely accidentally, to arrive at the door of a gentleman who had left Richmond a few years ago. He was an attorney. As he walked up and rang the door bell he didn't know where he was. He rang and rang. The fellow upstairs stuck his head out of the window and said, "Jack, you damn darkey, what the hell are you ringing that door bell down at my front door for?"

The darkey replied, "Thank God, boss, I can't see you but I can tell from that language that you are one gentleman, and thank God I hit the right place at last." (Laughter.)

Yesterday, when I got here I heard Cotton's voice and somebody else's. I knew the gentlemen were here and it made me feel at home.

Now, gentlemen, our program here, I think, has been very well gotten up by our Program Committee. I feel very grateful to them for it.
The next in order is the roll call. Shall we have that?

DR. MAYO: I move that the roll call be dispensed with.

(The motion was regularly seconded and unanimously carried.)

PRESIDENT FERNEYHOUGH: Then, the minutes of the meeting will be read, according to rules of order. Shall we have the minutes of the meeting, or what is the wish of the assembly?

SECRETARY DYSON: The minutes of the meeting are embodied in the annual report.

PRESIDENT FERNEYHOUGH: I think Dr. Dyson is right. That was agreed upon last year, so if it is agreeable to the assembly we will dispense with the reading of the minutes which you will find in the annual report.

The next, I believe, is unfinished business. If there is none, I think, the next in order perhaps is what is known as the President's address.

Now, gentlemen, I have enjoyed being with you, taking part in some of your little debates and having a few jokes, but when it comes to this thing as a presidential address I am not quite equal to it.

I am a little bit like the little boy was when his mother told him he must say his prayers the first thing every morning. The little fellow said, "I don't know what to say."

His grandfather was a minister. She said, "Just say what grandfather says when he gets up in the morning."

"I remember what grandfather said yesterday morning when he got up."

"What did he say?"

"I don't like to tell you."

"Well, what did he say?"

"Well," he said, "he went up before the glass and said, 'Oh, hell, I hate to get up this morning.'" (Laughter.)

Nevertheless, I will have to do my duty and do the best I can, so bear with me.

(President Ferneyhough read his address.)
ANNUAL ADDRESS

Of the President of the United States Live Stock Sanitary Association.

Gentlemen:

Indeed I am proud to be honored with the privilege of calling to order this 28th Annual Convention of the U. S. Live Stock Sanitary Association. I truly regard this organization as the most important of its kind in the world today. The results of our deliberations, while here assembled, not only affect the economic and commercial interests throughout this nation, as the same pertain to the prevention, control and eradication of disease among our live stock, but what is nearer to our hearts, and dearer to our homes, is the fact that we no longer merely believe, but know that this Association is helping to solve the problems which directly relate to the protection of human, health and life, which in turn, brings happiness and good will to all mankind.

While I am proud because you have honored me so, I am humble because I know no more. Yet, when I look at this body of progressive men, with trained minds and determined hearts, it truly inspires me, as I realize that every branch of the veterinary, and live stock profession, is represented here by men who are masters of the subjects which shall be brought before us for consideration, therefore the discussions are sure to be not only interesting, but instructive to us all. Indeed, to attend the U. S. Live Stock Sanitary Association is always quite an inspiration to me, because I know that if I will, I can get much valuable information from you.

I am anxious that this meeting shall be conducted according to order throughout the session, yet I want everyone to feel perfectly at home, and free to express his views on all questions which arise, if he so desires.

The Program Committee has arranged the subjects to be presented by the different Committees, but this is merely to bring each subject properly before the convention, when it is then open for debate, to those who desire to express themselves, and it is your duty to give the convention the benefit of your knowledge and opinion. With the view of having ideas and suggestions offered for consideration, I requested the Chairman of each Committee to confer with the individual members, and thus bring to us some concrete plans, in order to let the convention have each subject then presented in the beginning, to save time, and to get at the heart of the same without unnecessary delay.

All of you recognize the importance of the Policy Committee. Here is where we frame our structure. The object and life of this Association depends on its policy. Every organization must have a definite course of procedure, else it will fail to function as it should. While I shall not attempt to discuss, in detail, the subjects assigned to the different Committees, yet I want to call your attention to the fact that the Policy Committee, in my opinion, is supposed, in a measure at least, to suggest to this convention the outline of our future work, such as regulatory methods; our relation to college work; the proper distribu-
tion and use of biological products, especially when the same contain living organisms; any proposed amendment to our constitution; the relationship between State and Federal officials, the practitioner, the live stock owners, etc. Therefore, I invite you, one and all, to pay special attention to the report of the Committee on Policy. I know the members have worked hard to try and offer something constructive, so please give their report your careful attention and consideration.

The program has been so arranged as to provide that many of the contagious and infectious diseases affecting our live stock will be presented to the Association, by special committee reports. Each disease in question will then be before the body for discussion.

I cannot help but mention the wonderful work which has been conducted by the U. S. Bureau of Animal Industry, and the State Officials, of the States of California and Texas in the fight to control and eradicate contagious foot and mouth disease from said States. In fact, when we consider the nature of the country, its range conditions, lack of fences, etc., with the ever passing automobile, to my mind, the control of said disease has been nothing short of a marvelous accomplishment by the officials in charge, and this Association, I trust, will go on record as acknowledging the splendid service which has been rendered this nation by Dr. John R. Mohler, Chief of the U. S. Bureau of Animal Industry, his staff, and the State officials, cooperating, in the successful control and eradication of one of the most contagious and dread diseases of live stock which is known to the live stock industry. From what I have been able to learn, the recent fight against foot and mouth disease in this country has been sufficient to test the knowledge, wisdom and endurance of the men in charge, both in the field and at the desk. They have stood the test, and actually won their spurs on the field of battle, in my humble opinion. This being the case, I feel quite sure that the U. S. Live Stock Sanitary Association will gladly say to those who have rendered such valuable services to our nation, "well done good and faithful servants."

The work in applying the tuberculin test has progressed very satisfactorily during the last year, throughout the country, as far as I can judge. In June of this year, I had the pleasure of attending the Fifth Annual Eastern States Conference on the Eradication of Tuberculosis of live stock, which convention was held at Albany, New York. I desire to say that I never attended a more instructive or interesting session on the subject in question than the occasion above referred to. The program was well arranged, and filled. The discussions were snappy and to the point, and while it was a real business meeting, nevertheless the good people of Albany and especially the State officials, from Governor Smith down, were most attentive, and I, for one, shall never forget that pleasant visit to Albany, in June of 1924. Those of you who are especially interested in the control and eradication of tuberculosis of live stock would find, I believe, some good reading on the subject contained in the report of the proceedings of this meeting held in Albany, New York, June 10th and 11th, 1924.

Relative to the application of the tuberculin test, I think we should be very careful to avoid too much propaganda. That is to say, we must
not allow ourselves to picture things to the live stock owner which might cause him to expect better results than perhaps he should. Tell him the truth, and allow him to think for himself. Then when he is convinced, he will be a true supporter. We should not try to explain what we really feel we do not understand, ourselves. It is our duty to help a man see his mistakes when we know that by so doing we can assist him, though we must not attempt to cover up what we do not know by mere propaganda. Remember that such mistakes, like chickens, come home to roost, and while all of us make errors at times, it matters not how careful we are, at least, try to avoid the same as much as possible, and remember, when we do not know, "an honest confession is good for the soul."

Our Duties to Our Fellow Workers in Connection With Official Work.

While the majority of officials, State and Federal, recognize the proper courtesies due one another, and, I believe, as a class, no officials are more anxious to be ethical than the members of the Live Stock Sanitary Association, yet we are often misunderstood in this connection. For example, as State Veterinarian of Virginia, I should not expect the State official of another State to go but so far in helping me enforce Virginia's regulations. If a man in the State of North Carolina ships cattle into the State of Virginia against our regulations, I should not blame the officials of North Carolina, but hold the party violating our regulations responsible. Of course, I would not like for a State official of another State to advise anyone to violate our regulations, though all things being equal, I must protect my own State. Cooperation of State officials is quite right and necessary, though we should never allow others to shoulder our official responsibilities; and, above all things, we who have the honor of holding an official position should never dodge the issue, or even attempt to "pass the buck." No, do not go in swimming if you are afraid to get wet!

Always consider the interest and personal feelings of the live stock owner. While it is often very necessary to be firm with owners of live stock, in order to have their respect and support, in controlling the spread of disease, yet it is seldom the case when an official cannot use tact, and, at least, show some consideration for the feelings of the man whose stock must be quarantined. If you will only keep live stock of your own, you will soon realize that a fellow feeling makes us wonderous kind. Just put yourself in the other fellow's position for a while, if you can.

The Veterinary Practitioner.

I must say a word concerning the private, or practicing veterinarian. Here, is the milk in the cocoanut. If propaganda has caused live stock owners to believe they should get better results than can honestly be expected from a certain line of treatment, or from the use of specific drugs, serums, vaccines, or whatnot, then the failure to obtain the expected results, in the majority of cases is going to be passed directly to
the practitioner, as the paid official, who spreads this propaganda, like
the promoter in a town boom, has usually moved on before time to get
results.

We officials are not always as considerate as we should be of the
practitioner. For example, when a herd owner comes to us, and says,
“Doctor A—— (a practitioner) tested my cattle and classified several
as reactors. Yet, on post mortem examination he did not find visible
lesions in two. Now, what is the matter?” And the official replies:
“Well, I do not know, I was not on the grounds at the time, thus cannot
say what the trouble was, etc.” Now gentlemen, granting, of course,
that the practitioner was a reliable and qualified man, I contend that
such remarks from officials to stock owners, relative to the work of
practitioners, are unfair and wrong. For the Lord’s sake, in many cases,
what would the official have seen or done had he been there, other than
the private practitioner did? Wiseacres, we officials may be, at times,
I fear, but I wonder if the honest, competent, practicing veterinarian
does not often feel sorry for us. However, I am happy to say that such
instances as I have attempted to cite seldom occur in our work these
days. In fact, I can see each year a better feeling and understanding
between the practicing veterinarian and the veterinary officials. No liv-
ing man is prouder of realizing that such is the case than I, your
humble fellow veterinarian and co-worker.

In Virginia, the accredited herd work, creating the necessity for
the accredited veterinarian, has simply cemented what has long since
been a good feeling between the State Veterinary Department and the
practicing veterinarian of the Old Dominion. I thank God for it, for
while they respect me as their State Veterinarian, I regard them as my
mainstay. We know each other.

In conclusion, I wish to say some of our very active members have
called my attention to the fact that it is believed by many veterinarians,
and live stock owners, that the practice of immunizing hogs, horses and
cattle at public stock yards is often abused, since this work is not always
properly supervised by trained veterinarians. I therefore wish to call
your attention to the fact that it might be wise for the U. S. Live Stock
Sanitary Association to give this subject more consideration in the
future than it has received in the past.

PRESIDENT FERNEYHOUGH: The next order of business is re-
ports of Special Committees.

DR. A. W. MILLER: The Committee on Foot and Mouth Diseases
is ready to report.
REPORT OF THE SPECIAL COMMITTEE ON FOOT-AND-MOUTH DISEASE

Chicago, Illinois, December 3-5, 1924.

There has been little change in the foot-and-mouth disease situation in foreign countries during the past year. The disease has been about as prevalent as usual in most of the countries of continental Europe, Asia, Africa and South America. The infection still persists in Great Britain, where 1,482 outbreaks have occurred during the first ten months of this year, compared with 1,856 outbreaks for the whole of the calendar year 1923. In that country, however, there has not been the same strict adherence to the slaughter method as in this country. Forty or fifty herds which contracted the disease were not slaughtered, but were quarantined and treated. There is more than a strong suspicion that in several instances such herds were foci from which the virus was spread to other premises.

Another difficulty encountered in endeavoring to combat this malady by quarantine and treatment is illustrated by the following case reported from Scotland: The disease was confirmed on November 12, 1923, in a herd containing 57 cattle and 40 sheep on the Arngask Farm, Glenfarg, Perthshire. Forty-three of the 57 cattle and none of the sheep contracted the disease. Three cattle died during the outbreak. The last animal recovered on December 7. Final disinfection of the premises was completed on January 19, 1924, and the quarantine was lifted on March 14. On May 14, 1924, the disease was again confirmed on these premises, two cattle being affected out of the 14 which remained healthy during the previous outbreak. It was then decided to slaughter all the animals (including recently born calves) which had not contracted the disease on the first occasion. This is only one of a number of examples that might be given to show that with our present knowledge it is practically impossible to stamp out the infection by quarantine and treatment methods.

A notice issued October 29, 1924, by the U. S. Department of Agriculture declared that Norway, Sweden, Ireland, Channel Islands, Australia, New Zealand, Japan, Guam, Union of South Africa, Canada, Mexico and the islands of the West Indies, with the exception of Jamaica, were free from foot-and-mouth disease. Since that date there has been a small outbreak of the disease in the vicinity of Malmo, Sweden, and consequently that country, for the present, should be dropped from this list. The last outbreak of the disease in Jamaica occurred in December, 1923, and the Jamaican authorities in September of this year removed all quarantine restrictions. The whole of the West Indian, therefore, may be considered as free from the disease. In addition, the Central American countries, Colombia and possibly two or three other countries in South America, are probably not infected.

On account of the widespread prevalence of foot-and-mouth disease, importations of cattle during the past year into this country from other
than North American countries have been limited to shipments from the Channel Islands. Animals coming forward from those islands are trans-shipped in Plymouth Sound without landing, and hay and other fodder for their use during the voyage across the Atlantic are taken from this side on the vessel that transports the animals to this country.

The Federal Bureau of Animal Industry has continued its efforts to close possible avenues through which the virus of this disease might gain entrance into this country. In pursuance of this policy, its regulations governing importations of hides, skins, wool, hay, straw, etc., have been revised and made more stringent. The new regulations are contained in Bureau of Animal Industry Order No. 286. Canada has also strengthened its regulations governing these commodities and now has in effect requirements substantially equivalent to those of the United States.

Another step in this direction has been the stationing of Dr. S. O. Fladness at Mexico City. Dr. Fladness has been sent to that country to keep in close touch with the live stock and agricultural situation, and especially to confer with the Mexican authorities in charge of live stock sanitary control work concerning matters of mutual interest with respect to live stock diseases and quarantine regulations. He will endeavor to secure, so far as possible, uniformity in the regulations of the two countries governing the importation of live stock, live stock products and other materials originating in other than North American countries which might serve as carriers of dangerous animal diseases.

Workers in foreign countries where this disease is established and enzootic have continued their efforts to perfect a vaccine or serum, but as yet the results have not been very satisfactory. For this purpose three principal methods have been used: First, blood or serum from animals that have recovered from the disease; second, artificially attenuated virus, and third, blood serum from a recovered case associated with virulent material. More beneficial results appear to follow the third or simultaneous method of inoculation. With none of these methods, however, has it been possible to confer permanent immunity. In April of this year, Frosch and Dahmen of the Hygienic Institute of the Veterinary High School of Berlin announced the discovery of the causative agent of foot-and-mouth disease. This discovery, if confirmed, is a great scientific achievement. Whether it will be of any practical value in the fight against the disease is yet to be determined.

Coming now to the domestic situation, this year has witnessed two invasions of our shores by this foreign animal plague, the first in California, where an outbreak was officially confirmed on February 23, the second in Texas, where the disease was diagnosed on September 27. In neither case has the source of the infection been definitely determined, although it seems probable that the virus which caused the California outbreak may have been introduced in garbage or other refuse from vessels docking at the Mare Island Navy Yard. A number of theories have been advanced to account for the Texas outbreak, but so far the origin of the infection is unknown. No connection has been established,
however, between that outbreak and the one in California. No new infection has been found in California since October 9. The last diseased herd in Texas was discovered on October 27.

The policy of immediate slaughter of diseased and exposed animals, the prompt cleaning and disinfection of infected premises, and remuneration of owners for animals and other property destroyed, which this Association is on record as favoring, was followed in suppressing these two outbreaks. No opposition of any importance was offered to this procedure, and it was again clearly demonstrated that for this country the slaughter method is the most effective and economical that has been discovered. The extent of these outbreaks and the number of animals slaughtered are shown in the two tables appended to this report.

Your committee, from all the information it has been able to gather, based largely upon experience gained in combating previous outbreaks in the United States and to a certain extent upon scientific investigations, is of the opinion that the most important factor in the spread of this disease is the infected or exposed animal, and that next comes the human being who has been in contact with diseased animals. Flies, we feel, play a relatively unimportant part in the spread of this disease, and commodities such as fruits, vegetables, shrubs, etc., not originating on infected premises are very seldom, if ever, carriers of the infection.

We desire at this time to bring the attention of the live stock sanitary officials assembled here, and through them to importers of live stock and merchandise, the importance of familiarizing themselves with the regulations governing the importation of live stock and commodities into the United States and Canada and the necessity of obtaining proper certificates if annoyance and expense and possible return of their shipments to the country of origin are to be avoided.

Your committee recommends that the Federal Bureau of Animal Industry and the live stock sanitary officials of any state in which an outbreak of foot-and-mouth disease may occur forward to all state live stock sanitary officials, immediately following confirmation of the diagnosis, a definite statement giving the extent of the outbreak, probable source of infection, character of the country, and any other information that will be of value to such officials in promulgating regulations for their respective states. We heartily endorse the policy in this respect that was pursued by the officials in charge of eradication work in California and Texas.

There is one further matter that we desire to bring to your attention, that is the subject of uniform foot-and-mouth disease regulations. Immediately upon receipt of information that the disease existed in California, many of the states promulgated regulations of varying severity. It is not believed that any good purpose would be served by entering into a discussion of the whys and wherefores that prompted the issuance of these conflicting regulations, but it is clear from many communications that have been received from prominent live stock owners, important live stock organizations and not a few live stock sanitary offi-
cials, that there is practically a unanimous demand that this Association
should place itself on record with respect to this subject. Accordingly,
your committee has given this subject careful study and is submitting
its views for your consideration.

A. W. MILLER, Chairman,
GEORGE HILTON,
J. E. BOOG-SCOTT,
J. H. McNEIL,
S. E. BENNETT,
R. C. REED,
H. R. CHURCH,
L. H. HOWARD,
W. J. BUTLER,

Table No. 1

CALIFORNIA

<table>
<thead>
<tr>
<th>County</th>
<th>Herds</th>
<th>Cattle</th>
<th>Sheep</th>
<th>Swine Goats</th>
<th>Total Animals</th>
<th>Appraised Value</th>
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<tr>
<td>Alameda</td>
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<td>27</td>
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<td>Kern</td>
<td>7</td>
<td>176</td>
<td>0</td>
<td>4</td>
<td>181</td>
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<tr>
<td>Los Angeles</td>
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<td>14</td>
<td>8,089</td>
<td>20,910</td>
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<td>Madera</td>
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<td>4,542</td>
<td>8,667</td>
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<td>Solano</td>
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<td>518</td>
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<td>Stanislaus</td>
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<td>15</td>
<td>177</td>
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<tr>
<td>Tulare</td>
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<td>Tuolumne</td>
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<td>222</td>
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<td>935</td>
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<td>28,382</td>
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<td>902</td>
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$4,262,611.48*

Property estimate ........................................ 63,632.26*

$4,326,243.74*

*Estimated.

Table No. 2

TEXAS

<table>
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<tr>
<th>County</th>
<th>Herds</th>
<th>Cattle</th>
<th>Sheep</th>
<th>Swine Goats</th>
<th>Total Animals</th>
<th>Appraised Value</th>
</tr>
</thead>
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<tr>
<td>Harris</td>
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<tr>
<td><strong>Totals</strong></td>
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<td>8,468</td>
<td>27</td>
<td>61</td>
<td>8,556</td>
<td>325,012.50</td>
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</tbody>
</table>

$325,041.36

*All except 9 were exposed herds.
State of ............................................................... 

Proclamation by ..................................................................................................................

(Name of officer or organization)

Regulations Pertaining to Foot-and-Mouth Disease.

The fact having been determined by ..............................................................................

(Name of official or organization)
of the State of ........................................................... that a dangerous, contagious and communicable disease, known as foot-and-mouth disease, exists in live stock in the State of .......................................................

Now, therefore, I (we) ...........................................................................................................

(Name of official or organization)
acting under .........................................................................................................................

(Give authority of the State)

........................................................................................................................................

for foot-and-mouth disease.

(Describe area quarantined, preferable by counties)

The following regulations shall be and remain in effect until otherwise ordered:

1. The transportation, movement, trailing or driving of cattle, sheep or other ruminants and swine from the quarantined area of the State of ............................................................. into the State of ....................................................... is prohibited.

2. The transportation, movement, trailing or driving of cattle, sheep, other ruminants and swine from areas outside the quarantined area of the State of ....................................................... into the State of ....................................................... is prohibited unless such shipments are accompanied by a special permit in writing first being obtained from ...........................................................

(Name of official)
at .................................................................................

State of ............................................................... 

3. Horses, dogs, pet and show animals shall not be admitted from the quarantined area of the State of ....................................................... into the State of ....................................................... except upon written permission first obtained for each shipment from ...........................................................

(Name of official)
at .................................................................................

State of ............................................................... 

(Place)

4. The transportation, movement or shipment of dressed carcasses of cattle, calves, sheep, other ruminants and swine from the quarantined area of the State of ....................................................... into the State of ....................................................... is prohibited unless bearing the U. S. Inspected and Passed Legend of the Federal Bureau of Animal Industry.

5. The transportation of biologics, hides, skins, hoofs, horns, wool and hair of cattle, sheep, other ruminants and swine, hay, straw, fodder or forage, manure, and second-hand bags or sacks from the quarantined area of the State of ....................................................... into the State of ....................................................... is prohibited unless such articles are transported in accordance with the regulations of the Federal Bureau of Animal Industry.

6. Fruits and vegetables from the quarantined area of the State of ....................................................... shall not be shipped into the State of ....................................................... unless they originate on premises free from foot-and-mouth disease and are shipped in new containers, and, if
packing material is used, are packed in new, clean paper or new excelsior.

7. Trees, shrubs, vines, plant cuttings, grass, scions, buds, roots, bulbs, flowers or greenhouse plants from the quarantined area of the State of .......................................................... shall not be shipped into the State of .......................................................... unless they originate on premises free from foot-and-mouth disease and are packed in or with new, clean paper, new shavings, new burlap, or new excelsior.

8. Milk, cream, cheese, or other dairy products shall not be shipped from the quarantined area of the State of .......................................................... in the State of .......................................................... unless such products are made from milk or cream that first has been pasteurized or sterilized.

9. Containers which hold or have held milk or cream shall not be shipped from the quarantined area of the State of .......................................................... into the State of .......................................................... unless they have been sterilized before shipment.

10. Emigrant movables, circus and carnival equipment shall not be shipped or moved from the quarantined area in the State of .......................................................... into the State of .......................................................... unless accompanied by an official certificate certifying that they have been properly cleaned and disinfected.

11. No railroad cars, motor trucks or boats used for livestock and which have been in the quarantined area of the State of .......................................................... since .......................................................... shall be brought into the State of .......................................................... until the said cars, trucks or boats have been cleaned and disinfected under State or Federal supervision before being used for each live stock shipment.

This proclamation shall be in full force and effect from ..........................................................

IN WITNESS WHEREOF, etc.

DR. MILLER: Mr. President, I recommend the adoption of this report and further recommend that the Committee approve the uniform draft and recommend to the states its adoption.

(The motion was regularly seconded.)

DR. C. G. LAMB: I notice this regulation requires that in the case of any shipment into the State of Kansas from the State of Texas they must first secure a permit from the official of the State of Kansas. Texas, we all know, is a good beef state. Two counties are more or less affected in Texas. Under the proposed regulation it would be necessary for a person several hundred miles from El Paso, or the western portion of Texas in which there had been no suspicion of disease or any exposure, to get a permit for each individual shipment into Kansas. Does it seem that that would be necessary in the State of Texas to obtain a permit for a shipment of sheep, for instance, going to Kansas for feeding? It seems that that would cause a great deal of, what seems to me, unnecessary delay and expense and bother to the shipper. It seems to me that a certain distance in miles, possibly, from the seat of infection where it would be necessary to require permit for interstate shipment would be sufficient rather than to include the whole state.
DR. P. F. BAHNSEN: With the interstate restriction put on, what is the state going to do about it? If the state would maintain an effective and efficient quarantine, I can readily see where each state might, with perfectly reasonable security, follow the suggestion offered by this Committee. On the other hand, if restrictions for interstate are inadequate, as I see it, there will be no security whatever to other states. It seems to me that the most important part is what the state is going to do about it. If they maintain an efficient organization then I think that many of our state regulations are entirely good.

DR. GIBSON: The President very kindly gave us all permission to express our views during this meeting. Of course, I had some experience in foot and mouth disease control work, and I have been a very interested spectator during the last year. The more I see and know about foot and mouth disease control the more I am settled in certain opinions. My first opinion is that there should be but one quarantine line.

Dr. Bahnsen spoke about the degrees of efficiency of the state organization. I feel perfectly sure that that local organization will be right, while the Bureau of Animal Industry is on the ground, and if there is any way to handle foot and mouth disease with certain closed area, and the rest of the country free area, it seems to me that is the way to control it.

Since the Texas outbreak various states have been trying to run surveys in the great State of Texas, and I think it is all wrong. I say that Uncle Sam is the sanitary surveyor when we have an outbreak of foot and mouth disease in the United States, and I say that Uncle Sam is efficient and knows his business better than any other man on earth and any country on earth. I say that the various states of the Union might well repose confidence in this sanitary survey. It is not the killing of the animal or the expense of the immediate outbreak that is a serious matter in connection with the outbreak of foot and mouth disease. It is the unnecessary widespread restrictions on normal business that might go on.

Of course, every state in the Union may feel more or less alarmed when there is an outbreak in the Union, but if we are to be actuated by this alarm then these unnecessary and cruel, punishing restrictions will continue to be put upon the business of this country.

If I were in control work today in any state in the Union I would repose confidence in the survey of the Bureau of Animal Industry, and what the Bureau of Animal Industry declared free area, while the conduct of the regular live stock of the country and other businesses that suffer so severely, I would adhere to, absolutely.

I think everybody knows that the lines are first drawn wide enough. Once in awhile there will be a breaking beyond all your restrictions. That might happen and undoubtedly will happen some time, but even if it did happen and you had to start another focus of infection, and start other regulations, the result would not be so hazardous to the business of this country as it is by running a lot of unnecessary restrictive lines throughout the country.
The State Board of Agriculture of Missouri had a meeting in St. Joseph. They have held meetings in different parts of the state. At the St. Joseph meeting they drafted the Missouri quarantine against Texas. I tried to convince them then that all they needed to know was the quarantine line and let it be known, and they should absolutely support the government up to that line. I believe, myself, that that is the way we should do it. We should always be careful not to kill business entirely with restrictions. Make your area reasonably safe and make the restrictions absolutely binding inside that line and outside let the country go on doing business. (Applause.)

DR. MARSH: I think the Montana representative was particularly responsible for introducing the section requiring a permit for cattle coming out of Texas. I can answer Dr. Lamb's question as to why we put on the state boundary. The state boundary is not an ideal way to do. You cannot handle it that way. That was the reason it was put in the regulation in that form. Of course, in the case of a large state, like Texas, that makes unnecessary restrictions, but, on the whole, it seems to be the only way we could figure out something that could be handled.

The reason we were interested in this particular regulation was, in the recent California outbreak, while the quarantine area was existing around the San Francisco district, there was quite some trouble which the California stockmen further south were having in trying to ship cattle to Montana and put them on grass up there. We talked it over and decided it wouldn't be safe. We didn't want to do it until more time had elapsed in the outbreak. Therefore, we considered that this provision would safeguard a situation like this. Had these cattle been shipped out there, without their asking us whether we would accept them, we might have run into Mercedes infection. That was the reason we were interested in the provision, not that we don't have confidence in the Bureau of Animal Industry quarantine, but the Bureau of Animal Industry nor anybody else can cover the ground thoroughly.

Here was a concrete case that existed and interested us in putting in the regulation. We feel, for proper protection, we should have it.

MR. J. E. BOOG-SCOTT: This permit business will have the effect of putting quarantine on the whole state which, for the first two weeks of the outbreak, is probably a good thing, because it gives the federal authorities and state authorities time to find out where they are at, and I don't think it is objectionable for that reason.

We were fortunate in Texas in having good co-operation from the railroads who happened to have an office adjoining us. They sent a very competent man to represent all of the railroads. I asked him to come up here, and he has made a very comprehensive report on the quarantines of every state which I would like him to give. I take pleasure in introducing Mr. H. F. Harvey to you. I think he can give you something on that subject that will cover the whole field.

MR. H. F. HARVEY: When this disease broke out in the state of Texas I happened to be in the proper location to get in the field of action. Ordinarily I am a representative of the American Railway Association.
Our business is anything that concerns the movement of traffic or transportation or commerce, either locally or interstate. We are as much interested in the movement of wheat from Minnesota or Colorado, from Illinois or Indiana as we are in cotton from Texas.

Immediately after the report of the Live Stock Commission went to the President, the railroads realized what they were up against, particularly the Southern Pacific who had the same experience in California, and called a meeting of the general managers of all the rail lines. At this meeting it was decided to organize a quarantine bureau, the purpose of which was to form a closer contact with the federal and state sanitary officials, and at the same time to be able to promulgate and issue to all carriers, a uniform and single system of quarantine regulation, by reason of which the commerce of Texas must comply, with to move.

In doing this, you understand, they were offering the full extent of co-operation. They elected me as Chairman principally because I was a representative of the American Railway Association who, in turn, represents every railroad in the United States. The rail lines practically gave me control of twelve large systems of railroads to the extent that the compliance with the rules and regulations of the state and federal governments were concerned.

The first duty, of course, was to assemble the regulations promulgated by the various states. After this was done, I found that only thirteen states out of the forty-nine reposed the confidence in the Federal Bureau of Animal Industry and were willing to abide by the regulations issued by that body.

There were four other states whose quarantine regulations covered only the four counties covered by the Federal Bureau, but these states were hardly satisfied with the federal regulations. They put on rules and regulations of their own. One state, a little more skeptical, took in twelve counties against the four covered by the government. Four other states took in half of the state of Texas, and twenty-six quarantined against the entire state.

Gentlemen, very few of you realize just what effect that has on any state until you have gone through it. In the first place, from the Louisiana border to the western edge of Texas the distance is 941 miles. Texas covers 267,000 square miles of territory—165,000,000 acres. Can you imagine it? Less than one-thousandth of one per cent was under federal quarantine, yet twenty-six states in this great Union of ours quarantined the entire state of Texas.

Now, then, the distance from the infected area to the western border of Texas was 841 miles. Supposing that this quarantine line had taken in the same distance in the other direction. You would have quarantined against the entire states of Oklahoma, Arkansas, Louisiana, Mississippi, two-thirds of Alabama, one-third of Tennessee, one-third of Missouri and one-third of Kansas. If you had, you would have been in the penitentiary by now. (Laughter.) It is the same distance fromHouston, the center of this infected area (not the center, but headquarters as the center makes a little difference) to Caryville, Alabama, two-thirds of the way across the state as it is to El Pasco, Texas.
I just want to give you a little line of the difference. We had, in the first place, the protection of the federal government which protected against the movement of cattle, sheep, ruminants and swine, against hay, straw and fodder, and against hides, skins, hair, etc.

As a matter of information, I have prepared a little chart here just to give you a good idea of what was done by the various states. At the top is the number of states. There are forty-seven not including Texas or the District of Columbia. By reason of Texas and the federal protection, there were forty-seven states protected against ruminants and swine. The next line is hides, wool, skins, etc. which was forty-seven states. The next line is hay, straw and fodder. When we get down to horses and mules only twenty-two states out of the forty-eight quarantined against them. The next article is dressed meat. Nineteen states quarantined against dressed meats; nineteen against biologics; fifteen against dairy products and fifteen against dogs; fourteen against pet stock and fourteen against live poultry.

The next item is second-hand grain bags. There were only nine states that quarantined against them. I believe, gentlemen, there is not a more apt conveyor of the disease than second-hand grain bags. Let me give you an illustration: Supposing this dairymen on whose territory the disease occurred had been hauling his feed out in grain bags, dumping them out and feeding the cattle, maybe letting them tramp around on the bags for a day or two. You know, I guess, there is always a junk man coming around and buying the bags. He gives them one or two cents apiece. He takes them in and sells them to somebody else for a nickel. Somebody in Texas has had a good crop of peanuts. They decided to ship a sack of peanuts for seed to Alabama, for example. They grab the second-hand grain bags. The farmer in Alabama empties the bag and then drops it in the manger. That is logical. Along comes Mr. Cow and goes to nosing around in the grain bag. I tell you, gentlemen, there isn't a more apt carrier of the disease than grain bags, yet you, with all of your carefulness, just left the gate open. If J. E. Boog-Scott in Texas hadn't taken care of you, Lord knows what would have happened.

Gentlemen, I concur very thoroughly in Dr. Gibson's statement that the federal regulations should be satisfactory. If we haven't got confidence in this government then we are a little less than they are in Mexico and they are always having trouble.

We were very fortunate in Houston in getting one of the most able men that the government had, in taking charge of the situation, Dr. Marian Imes. It didn't make any difference whether a man was worth one million dollars or an old farmer with two feet of whisker, whether he had ten cents or didn't have ten cents, Dr. Imes had time to talk to the man. It didn't make any difference what the business was, whether it was a trivial affair or involved carloads of freight, he had time to talk to them. Gentlemen, when a gentleman like that in charge of the situation you certainly should have confidence.

A great many of our states sent their representatives to Houston. They looked over the situation, and I guess some of you remember that you pretty nearly had to be dipped before you could come out of there.
Brother Scott’s outfit had the territory so well protected that the only thing that could get out of the infected area was a bird and it had to fly pretty high. Yet we stand back with our thumbs in our vest holes, basking in the sunshine of our prosperity and say, “Oh to hell with Texas.” Boys, you didn’t mean it that way. You know, the world is full of people who criticise without assistance but I want to say this to you, what I have to say in the way of criticism is only constructive criticism.

The Association, whom I represent, stands ready to cooperate and return to you 200% for every 100% cooperation you extend to them. They showed that in this arrangement at Houston, and I can say to you gentlemen, regardless of when or where this infection may strike you, if you will get in touch with the American Railway Association at Washington, D. C., you will be assured of 100% cooperation from the railroads in your territory. If you have the cooperation of the railroads, you have absolutely obliterated the idea of being unable to establish a quarantine line other than state lines. It has been demonstrated and worked very thoroughly and very nicely. For example, the 100 meridian was taken as the quarantine line and ninety-nine per cent of the people concerned didn’t know where the 100 meridian was. We looked it up. When you find the meridian line you can see where you can ship and where you can’t ship.

There were some states that took county lines. Some took just a little creek that ran through the state. But you know your state and the local railroad people know the state. It is no trouble for them. The only trouble, gentlemen, is for you to take enough trouble to go into a man’s state and decide what quarantine line you want to cover.

I just want to give you a few illustrations of what effect the varied quarantine regulations have upon the movement of commerce. You state veterinarians know that the federal government will not send an inspector or permit an inspector who is located outside of the quarantine line to pass upon a commodity which is quarantined against by a neighboring state. As an example of this: Boston, Massachusetts, is a great hide center. The Massachusetts regulation did not prohibit the movement of hides from the entire state of Texas, but only from the four counties. A shipper at San Antonio, 200 miles west of Houston, had a shipment of hides which he wanted to ship to Boston, Massachusetts. They had to go to Galveston by rail, Morgan Steamship line to New York Harbor, transferred there to the New England Steamship Company for movement into Boston, Massachusetts. New York would not permit that shipment to dock unless it was disinfected immediately before shipment under the supervision of a federal inspector. There is the federal inspector at San Antonio but he has instructions from Dr. Mohler, in Washington, “Discontinue disinfecting any commodity not covered under the federal quarantine regulation.” The result is this: a man out 210 miles from the infected territory, with cattle which, possibly would not get the foot and mouth disease if they lived to be 1,000 years old, cannot ship the hides to New York. Yet right here in the infected pasture, Boog-Scott would not let them out of the pasture. But this man can ship his hides to New York. That is the variance of the quarantine regulation.
Just a few days ago a certain railroad was offered a shipment of pecans from a station by the name of Hallettsville for St. Louis, Missouri. They were loaded in second-hand grain bags. Of course, the grain bags originated practically 200 miles from the infected area. St. Louis would have accepted the pecans from that particular territory and those second-hand grain bags, but they couldn't get through Oklahoma. Don't you see just what the various different forms of quarantine regulations do? When the assembling of regulations was completed we had just thirty-four different kinds of regulations. Today, only five states have modified the quarantine regulations to conform with the government quarantine. We have fourteen states yet, gentlemen, who still haven't the confidence in our government. I realize their position. They have to protect their state because it would be a disgrace for the rest of the lines, but I just want to say that we are all one big United States. So far as the imaginary line dividing Illinois and Indiana is concerned it amounts to nothing.

Unless we can cooperate, unless we can get together and absorb enough of the personality of our neighbor to have the confidence in him, and then work with him in handling features of this kind, you and I nor any one else has done his duty to his state.

If Indiana happens to be the next man that gets the foot and mouth disease let's all say, "Now, Mr. So-and-so from Indiana, we know you are going to protect the balance of your state. You have four counties quarantined. We know you are not going to let anything out of those four counties." If it can't get out of the county how is it going to get into Illinois or any other country. We still have that consulting power. We can say to Mr. Jones, "I don't think you have quite taken care of the situation. Let's add pitchforks to it. Let's just cover pitchforks in the quarantine regulation." I believe, gentlemen, if you get right down to the basis of confidence in the fellowman you can work this situation out to such an extent that the next foot and mouth disease outbreak won't be known outside of your own county. People in every state of the Union say, "If you are from Texas, I don't want anything to do with you." In the first place, we must be sure to protect ourselves. Brother Boog-Scott says this quarantine against the whole state is good. It is. It is fine, if you will modify it within a reasonable time, until you can send a representative to find out the territory you want to protect and find out for your own satisfaction what the federal government is doing, and then reduce the quarantine regulation accordingly. I thank you. (Applause.)

PRESIDENT FERNYHOUGH: Gentlemen, you have heard the discussion which has been pretty general. Are you ready for the question?

DR. MILLER: I would like to clear up some things. Dr. Lamb brought up this permit proposition. Let me say that throughout these ten sections there is absolutely no provision that requires anything on any kind of animal or any commodity originating outside of the quarantined area of the state with the exception of Section No. 2.

I am not going to give away any Committee secrets. It is a very difficult matter to harmonize the views of forty-eight states, of course.
It is quite a difficult matter to harmonize the views of nine committee members, and I see no reason that a state has to require that permit. We have put up to you what we say should be the maximum requirements. We feel there is absolutely no excuse for any state tacking on a lot more restrictions to these, but we know of no reason that they could not leave the section out if they chose to.

Of course, Brother Gibson and I fought and dined together over in Iowa in 1914. I am not sure whether Dr. Gibson just caught the point that we place under this plan no restrictions on shipments outside of the quarantined area. If the states want to conform to the Bureau of Quarantine, they can do so. They can describe the same territory. That is all there is to it.

The question was asked as to how these compared with the Federal Bureau of Animal Industry. If the quarantine industry was described the same way they would not be identical, because there are a few classes of live stock and a few commodities in the sections that we do not cover, such as fruits and vegetables, nursery stock, horses and pet animals. But the restrictions on those are not very drastic. For instance, on fruits and vegetables nothing is required but that they be not from infected premises, and we will guarantee they won't come off infected premises, and that they be packed in material which has not been used. That is all there is to it. I do not see any very great objection to this requirement.

I think those were the only questions raised, except Brother Bahn- sen's. I never have seen a state yet that had foot and mouth disease that didn't want to get rid of it and want to get rid of it as soon as they could. I believe the Association can rest assured if an outbreak occurs in any other state, the state authorities in that state are going to do everything in their power to eradicate the disease. I think that is all I have to say.

PRESIDENT FERNEYHOUGH: Dr. Miller, do I understand that you submitted a report of the Committee and regulations all in one?

DR. MILLER: I really made two recommendations. The first is that the Committee report (The report in itself, not the uniform regulations) be adopted. Then my second recommendation is that this Association approves the uniform regulations and recommends to the states their adoption to handle future outbreaks of foot and mouth disease.

(The motion for the adoption of the report was carried unanimously.)

PRESIDENT FERNEYHOUGH: It is in order to adopt the regulations now. Do you move the adoption?

DR. MILLER: I make that motion.

(The motion was regularly seconded and unanimously carried.)

PRESIDENT FERNEYHOUGH: We want to get through with all the special committees. Many of the committees, I suppose, have very little to say. Some of them are on the program. Are there any committees ready to report?

DR. DAVID S. WHITE: Mr. President, it was my understanding that the Advisory Committee is really an Advisory Committee which gives advice to the President when such advice is needed. It has never
filed, to my knowledge, an official report. Having, at this time, a President who obviously needed little advice, this Committee had very little to do. So where it is customary to enter a report it would have a very brief one to make, if any at all. With this explanation, Mr. President, I will be seated.

PRESIDENT FERNEYHOUGH: That is very satisfactory, and I feel very fortunate in having Dr. White to call on for advice.

We will now hear from the Credentials Committee. (No report) Finance Committee. (No report) Grievance Committee. (No report) Legislative Committee. (No report) Live Stock Diseases. (No report) Nutritional Diseases. (No report.)

PRESIDENT FERNEYHOUGH: We will hear from the Resolutions Committee of which Dr. Gibson is Chairman.

DR. GIBSON: It is customary to introduce the resolutions at the last session of the Convention. We simply request all who have resolutions they wish to have considered hand them in to the Committee.

PRESIDENT FERNEYHOUGH: Dr. Lamb, have you anything on Special Skin Diseases? (Not present) Tick Eradication Committee—is Dr. Flower here?

DR. C. A. CARY: Dr. Flower has a report. He will be here later.

PRESIDENT FERNEYHOUGH: That concludes the Committees, gentlemen.

We want to make the sessions as snappy as possible, and we must meet on time.

(The meeting adjourned at twelve-twenty o'clock.)

Adjournment.

WEDNESDAY AFTERNOON SESSION.

December 3, 1924.

The meeting was called to order at one-forty o'clock by President Ferneyhough.

PRESIDENT FERNEYHOUGH: The first on the program this afternoon is “The Control of Contagious Abortion and Sterility from the standpoint of the Clinician,” by Dr. W. L. Boyd, Professor of Veterinary Medicine, University of Minnesota, St. Paul, Minn. (Applause.)

THE CONTROL OF CONTAGIOUS ABORTION AND STERILITY FROM THE STANDPOINT OF THE CLINICIAN

By Dr. W. L. Boyd, University of Minnesota.

The subject assigned to me by the committee on bovine infectious abortion is one of the most interesting as well as one of the most baffling problems now challenging the progress of the clinician of veterinary medicine. Contagious abortion has become so widespread and prevalent that its numerous and varied characteristics are well known to the breeders of cattle. The men engaged in the breeding of purebred cattle fully realize that this disease with its sequellae is a serious menace to their industry, and they are constantly seeking information from the scientist as well as engaging the services of the practitioner in the attempt to make their business a greater success.
During the past decade the subject of abortion disease has been given a prominent place on the programs of both local and national veterinary association meetings as well as certain livestock breeders and live stock sanitary association meetings. The discussion created by the speakers or essayists are always interesting and usually long continued, which is indicative of the ever continued desire on the part of veterinarians, sanitarians, and live stock breeders to seek further information relative to the various phases of the disease.

**Diagnosis.**

Cows infected with bacterium abortus do not as a rule show any recognizable disturbance of health, until shortly before the act of abortion. In a certain percentage of cases the fetus will be expelled without warning or premonitory symptoms. The signs of symptoms of an approaching abortion are similar to those which characterize normal calving. Placentitis frequently associated with infiltration and edema of the chorion, constitutes one of the common symptoms of uterine infection. Following the expulsion of the fetus the fetal membranes are usually, though not always retained. This is somewhat dependent upon the stage or period of pregnancy. If the abortion occurs in the early stages of pregnancy the fetal membranes usually accompany the fetus. The pathologic changes occurring in the placenta of cows infected with bacterium abortus cannot be differentiated clinically from placental disease caused by other microorganisms.

Bovine infectious abortion like tuberculosis is not characterized by a certain train of symptoms by which the clinician can make an accurate and correct diagnosis.

**Serological Tests Most Accurate Method of Diagnosis.** These tests, both the agglutination and the complement fixation are widely used in the diagnosis of bovine infectious abortion. The agglutination test is the one most commonly used, due mainly to its simplicity. The results obtained from the tests used in combination are more accurate than those obtained from either test used alone. A positive reaction to the serological tests indicates past or present infection. This method of diagnosis will not tell us whether or not the reacting animal has or ever will abort, and because of this fact, numerous practitioners have condemned the test of being without practical value. The practitioner should be encouraged to recognize the value of these tests, as they not only enable him to make a correct diagnosis, but determine also the extent of the infection.

**Treatment.**

Many medicinal agents have from time to time been highly recommended and widely heralded as sure cures of abortion disease. Some of these so-called cures and preventives have been extensively used, but none have proven beneficial when subjected to a thorough test. Because abortion disease is incurable, the treatment necessarily is one of prevention. Bacterins, suspensions of killed organisms, have been in the past and are at the present time, being extensively used in the attempt to produce artificial immunization. This form of treatment has
not proven satisfactory, though a recent publication indicates the hope that a beneficial bacterin may yet be developed. Vaccines consisting of living organisms are being used by a large number of practitioners, the results of which are not very encouraging. The treatment of contagious abortion with biological products should be considered as still being experimental.

Sanitation and isolation are important factors in the prevention and control of contagious abortion. Sanitation has reference to the care of the stable and yards together with the handling of animals of the herd in such a manner, that the amount of infection being spread will be constantly reduced to a minimum.

Isolation of the heifer or cow that shows signs of an approaching abortion, is of the greatest importance. The infected cow is the most dangerous as a disseminator of infection at the time the fetus is expelled. The animals that abort without warning, should be isolated as soon as discovered. The practice of sanitary management and isolation will not by any means prevent all cases of abortion, but the results obtained will be very beneficial, and such practice should be highly recommended to all breeders of cattle.

Retention of the Fetal Membranes an Important Symptom of Uterine Infection.

Retention of the fetal membranes following the act of abortion, or premature birth, or occurring at the termination of the normal gestation period is usually though not always the result of placentitis. If we are to accept the results of the serological tests, and the findings of the microscopic studies of diseased placentae, also the results obtained in the inoculation of small animals with the extract of these tissues, we must conclude that bacterium abortus is by far the most common organism which invades the fetal membranes. All cows with retained fetal membranes should be isolated and the treatment of same should be attempted only by the veterinarian. Owners and caretakers of cattle do not fully appreciate the seriousness of this diseased condition, and the clinician who educates his clients along these lines is rendering a more efficient service. Retained fetal membranes retard involution. Normal involution is a barrier to infection and when the various phenomena constituting this physiologic process are interfered with, secondary invaders or organisms often produce pathologic changes to the extent the animal may become temporarily and occasionally permanently sterile.

Treatment of Retained Fetal Membranes.

The question "When is the proper or best time to remove the fetal membranes" remains unanswerable. Veterinarians differ widely in their opinions as to what constitutes the best or proper treatment for this very common yet tremendously serious condition. The writer is of the opinion that manual removal is the most satisfactory method of treatment, where it is performed with due consideration for individual cases. Manual removal of the fetal membranes should be attempted when the placenta can be detached without resulting in irritation, pain, or hemorrhage. In cases where placental necrosis is extensive, with
sloughing of the cotyledons and thickening of the chorion, the membranes and tissue debris should be manually removed. Careful and frequent douching or irrigation of the uterus with hot normal saline solutions may be used with good results, following manual removal of the afterbirth. Absence of muscle tone characterized by failure of the uterus to contract when stimulated by the hand or irrigating fluids, and the presence of a reddish-brown offensive discharge should warn the operator against douching.

Irrigation or douching of the uterus while the fetal membranes are attached is impossible and should not be generally practiced. When manual removal of the fetal membranes cannot be accomplished, the injection of mineral oil or liquid vaseline into the fetal sac is frequently practiced. Gelatine capsules containing antiseptic powders are frequently used in the treatment of retained placenta. The capsules are introduced deep into the uterine cavity. The extent to which these various forms of medication control putrefaction and lessen the danger of metritis is questionable.

Importance of the Sire in the Control of Contagious Abortion.

The sire is no longer considered as important a factor in the spread of the infection, as was the case a few years ago. Nevertheless the importance of the sire as a disseminator of the infection should always be taken into consideration in the prevention of the disease. The sire should be subjected to the serological tests and reacting bulls should not be used on healthy cows. Physical examinations of the reproductive organs should be resorted to in the attempt to eliminate infected animals. The douching of the sheath of the sire is good hygienic practice but is of little or no value in animals with infected epididymes or seminal vesicles.

Sterility.

Sterility is present also in cases with congenital defects of the organs of reproduction. Failure to breed may also be due to physiologic causes, such as lack of exercise, obesity, and advanced age. The relation of diet to reproduction is receiving more attention than ever before and experiments when conducted with cattle as well as with small animals will probably shed much light on the subject. The clinician who fails to take the bull into consideration in the control of sterility is making a serious mistake. Physical examinations of the sire are not sufficient to disclose all cases of sterility, and microscopical examinations of the semen should always be conducted. The microscopic examination should preferably be made following the act of service, though it may be performed by securing the semen which will frequently be ejected following massage of the seminal vesicles.

The treatment of sterility has proven to be beneficial in the large percentage of cases. Owners now realize the importance of frequent and regular examinations of their herds in the attempt to control abortion disease and sterility. Incurable cases should be detected as early as possible and sold for immediate slaughter. Chronic or long standing
cases are as a rule unsatisfactory to treat. The ability to diagnose pregnancy is an important part of the equipment of the clinician who treats sterility. The possibility of pregnancy existing in the patient presented for treatment should never be overlooked, regardless of what the owner or herdsman may say. By keeping this fact constantly in mind many serious as well as unpleasant and embarrassing situations will be avoided.

PRESIDENT FERNEYHOUGH: The next on the program is “The Control of Contagious Abortion from the standpoint of the Breeder,” by Mr. H. W. Norton, Jr., Live Stock Commissioner, Lansing, Michigan. (Applause.)

CONTROL OF CONTAGIOUS ABORTION FROM THE STANDPOINT OF THE BREEDER

By H. W. Norton, Jr., Live Stock Commissioner, Michigan.

We are told that contagious abortion of cattle has been more or less prevalent from time immemorial and, such being the case, we must be thankful that nature has provided an acquired immunity, else the dairy cow, “the foster mother of the human race,” would have long since become extinct.

The average individual has no knowledge of this dread scourge and few of the dairymen or livestock breeders themselves appreciate the appalling losses which may be charged against abortion disease throughout the country. In its virulent form it may swoop down upon the herd and destroy practically the entire calf crop for the year and at the same time decrease the milk production by twenty-five to fifty per cent. This is followed by more abortions or, worse still, by sterility and other complications. In its milder form it undoubtedly smoulders in a very large percentage of the herds throughout the country, warning the owner of its presence by an occasional abortion and waiting for the time when, fanned by favorable conditions, it flames forth in all its fury and ravages the herd.

Losses Due to Abortion Disease.

No figures are available and one hesitates to make any attempt at calculation, the losses are so staggering, but let us consider briefly the cattle population of the five states, Ohio, Indiana, Illinois, Wisconsin, and Michigan. According to the Fourteenth Federal Census, taken in 1920, Indiana had 608,000, Michigan 802,000, Ohio 888,000, Illinois 957,000, and Wisconsin 1,795,000, making a total of 5,050,000 dairy cows and heifers two years old or older. From the same source, we learn that the average annual production per cow in these states is 3,782 pounds of milk. A reduction of twenty-five per cent in milk flow, which might be taken as an average for aborting cows, would mean a loss of 945 pounds per cow, which at $2.00 per hundred weight would be worth $18.90. Add to this the loss of the calf, valued at $3.00, and the annual loss on each aborting cow in the way of offspring and milk production would amount to $21.90.

There are no figures to show the percentage of abortions in the herds. Surely one per cent is too low, for this would mean only one
abortion in ten years in the ten-cow herd. Such a loss would be over-
looked and forgotten by the average dairyman with his lax system of
records. I am inclined to believe that five per cent is a very conserva-
tive estimate, for this would only mean one abortion in two years in the
ten-cow herd, and this would doubtless be explained by the owner as due
to accident.

Let us assume, then, that five per cent of the dairy cows in the
states of Ohio, Indiana, Illinois, Wisconsin and Michigan, or 252,500,
abort annually. With an average loss of $21.90 per cow, this means a
loss of more than five and one-half millions in the aggregate to the
dairy farmers of these five states from abortion disease each year.

To be sure, five per cent may be a high estimate of abortion losses.
I hope so, but these figures do not take into consideration sterility nor
other disorders attendant upon abortion, nor has any allowance been
made for losses in the beef herds of this section, which include upwards
of 600,000 cows and heifers over two years of age. With these margins
of safety, it is fair to assume that the estimates given are not exag-
gerated and that actual losses in these five states alone run well into the
millions each year.

Cause of Abortion.

In the average ten-cow herd, a five per cent loss, that is, one abor-
tion in two years, would usually be explained as due to accident. Per-
haps the cow was badly hooked by another or jammed in crowding
through a narrow stable door. She may have fallen on the ice in the yard
or slipped on the smooth floor in the barn. She may have been taken to
the fair and handled roughly in the truck or bumped in the freight car.
There are any number of plausible excuses which the owner can sum-
mon to support his case.

The scientist, on the other hand, tells us that abortions are due to
abortion infection, and since this is one of the few points on which in-
vestigators of the subject quite generally agree, we will discard the
theory of accident except in very unusual cases. Lack of minerals and
lack of vitamins in the feed may undoubtedly account for abortions in
many cases, but in treating the subject from the breeder's standpoint
we assume that these factors are all eliminated and that the campaign
must be directed against the invisible empire of the abortion producing
germ.

Remedies.

Many plans of attack have been and are now offered, such as vac-
cination with attenuated organisms. I have seen this tried out in a large
herd of purebred animals and the twelve months following injection
showed greater losses than any similar period in the preceding decade.
This increase in actual abortions may not have been due in any way to
the use of the organism, but it is safe at least to infer that no bene-
"
fore employing this method, the owner of the valuable breeding herd wishes to know that laboratory results will be borne out in practice and that the laboratory training acquired by this non-virulent germ during his college career will continue to shape his course when turned loose, out in the wide, wide world. It may be that after a few generations of stable environment he will lose track of his acquired tendencies of benevolence and protection to the bovine race and once more assume the role of the transgressor.

Vaccination with virulent cultures is also advocated but has many objections. If used on pregnant cows, it will doubtless result in many cases of actual abortion. If used on open cows, they become carriers and must be treated as such and isolated, at least for a few weeks, at the time of parturition. When this method is employed, it seems logical to vaccinate only those animals which are positive to the test and the injection should be made before the cows are bred.

The use of serum as a preventive measure in badly infected herds has its advocates, regardless of the fact that it is expensive treatment. Where abortion losses have diminished or ceased entirely following serum treatment, it may have been due to acquired immunity rather than to the use of the serum. Immunity resulting after abortion has been capitalized for years by unscrupulous practitioners and by manufacturers of so-called abortion cures, making it extremely difficult to determine whether any treatment is actually producing results.

Handling the Herd.

What then shall the breeder do to control this dread disease? Shall he experiment with unproven methods or shall he follow out all possible precautionary measures of isolation and sanitation and accept the result as the best to be secured? I believe the latter course is safest with our present knowledge of the disease.

Keep the herd in thrifty, vigorous condition by liberal feeding with a properly balanced ration based on good clover or alfalfa hay, with silage or roots to furnish succulence during the off-pasture season. Any animal is better able to ward off disease if well fed and cared for and properly stabled. Properly cured roughage in the form of clover and alfalfa, combined with a good grain mixture, should provide sufficient vitamins during the dry feeding season. Supplement the grain mixture with minerals. With the state institution herds in our own state, we mix all of our grain rations and include one per cent each of steamed bone meal, calcium carbonate, and ground rock salt to the ton.

Stables should be well lighted and ventilated and kept clean and sanitary and should provide facilities for isolation at time of calving.

The Blood Tests.

Apply the blood test at least twice yearly to all animals of breeding age. Cows which show a positive reaction will not necessarily abort and some of the negatives may abort; but while the abortion tests, like the tuberculin tests, are not one hundred per cent accurate, they are the best diagnostic agents we have to work with at the present time. The blood samples taken should be labeled carefully and the test applied by a thoroughly competent operator.
Culling the Herd.

If the test reveals the presence of infection, as it probably will, cull out all positives that are questionable from the standpoint of production, type, or breeding and send them to the butcher. One-third of the so-called dairy cows of the country are boarders and should be disposed of on general principles, regardless of abortion or any other disease, and the dairyman who keeps these animals in his herd is unable to distinguish between an asset and a liability. The same thing applies to many of the purebred herds of the country. One of the chief obstacles to the advancement of the purebred live stock industry is the breeder who thinks that every purebred animal should be kept for breeding purposes regardless of type, just because it is a purebred, and a thorough culling of the breeding herds of the country would be a wonderful step in advance, providing, of course, that the culls were sent to the block and not into some other herd.

Desirable animals, cows of good type, breeding, and producing ability, even though they show positive to the blood test or have actually aborted, should be kept, as they are too hard to replace. Exceptions to this might be made in case only one or two positives are found in the herd, when it would be advisable to remove them entirely.

Care of Infected Animals.

If stable facilities permit, the positives should be kept separate from the balance of the herd and further infection prevented if possible. In most cases, however, this is not practicable and it becomes necessary to stable the positives with the rest of the herd during the greater portion of the year. Such being the case, every infected animal should be watched carefully and removed from the herd to separate calving quarters a week or so prior to parturition or immediately upon showing the slightest indication of aborting and kept away from the herd until all uterine discharges have terminated. It has been quite clearly demonstrated that the infection is spread at this time and isolation during this period seems to be the best means of control. When abortion actually occurs, the cow should be removed at once from the herd, fetus and membranes burned or buried, and premises thoroughly cleaned. Nothing is better for cleaning than a strong solution of concentrated lye in hot water, and manger, stall, floor, and gutter should be scrubbed thoroughly.

If the aborting cow is a grade cow of ordinary producing capacity, she should be sent to the block. If she is a valuable breeder or producer, she should have the attention of a competent veterinarian and be kept isolated until thoroughly cleaned up and free from discharge. In arriving at a decision as to the disposition of the aborting cow, the herd owner should bear in mind that the cow may be a carrier from now on and as such must be isolated from the herd at least for several weeks during each year; that her milk production for the present year will be materially lessened; and that sterility may follow, entailing heavy fees for veterinary services to put the cow in breeding condition, with possible failure, which would necessitate slaughter for beef. This makes a bad combination, so unless the cow is a good one she should go to the block.
The cow kept in isolation should have just as good care and feed as the other members of the herd, a fact which is very frequently overlooked in practice. Keep the cow clean and feed her liberally with a properly balanced ration, such as she would have in the regular herd. If she does not clean promptly, and retained afterbirth very frequently goes with abortion, a competent veterinarian should be employed to remove the membranes. Daily irrigation of the womb and vagina with a normal salt solution at body temperature may assist in getting rid of the discharge, but disinfectants should be carefully avoided unless handled by a trained veterinarian and then must be used in very mild form. Much harm has been done in the past by using too strong solutions in flushing out the reproductive organs of the cow and thus setting up irritation and inflammation which produced serious results.

Keep the cow clean. Clipping the tail and hind-quarters will aid materially and should be practiced in all dairies as a means of producing clean milk. For external disinfecting around the tail, vulva, and hind parts, a good standard commercial preparation may be used.

From the very nature of his business, the cattle breeder, using the term in its true sense, is progressive, yet he must be conservative in regard to methods of abortion control. He must be shown before he is willing to try out something with which he is entirely unfamiliar, for upon the success or failure of the experiment may rest the work of a lifetime. He still respects the time-worn adage, "Be not the first to try the new, nor yet the last to put aside the old," and will be ready to adopt new methods whenever they are proven successful.

Cattle breeding is an industry of gigantic proportions. According to the 1920 census, the cattle population of the United States totaled 68,674,086 head, representing a value of $3,651,970,229.00. Here then is a great opportunity for service, for I say without fear of successful contradiction that abortion disease takes a greater annual toll than any other from the cattle industry of this country.

I believe that isolation and sanitation, along with good care and liberal feeding of properly balanced rations, are the best control measures we have as yet. It may be that the use of the virulent culture on the positive reactors or of some non-virulent organism on the entire herd will prove the solution. The answer is something which the future holds in store and you gentlemen and your colleagues of the laboratory and field must work out this problem for the live stock industry.

PRESIDENT FERNEYHOUGH: I don't believe there is going to be a subject that we are going to be more interested in than the subject which is before us now. We feel rather partial to it, because we know the trouble we are having in the country.

We are not exactly like the farmer was who came up here on a fox hunt. The old gentleman was with us. The train was crowded. There was a young lady sitting right across from us. She had on a modern skirt and was endeavoring to keep the skirt down. The old farmer said, "Hic, lady, don't bother," he says, "that don't interest me. Whiskey is my weakness."

I am sure we are all interested in this subject. The next speaker is going to present an especially interesting feature. It is "Regulating
REGULATING TRAFFIC IN CONTAGIOUS ABORTION.

Dr. J. H. Coffman, Assistant State Veterinarian, Georgia.

Regulations restricting and controlling the movement of live stock from disease infected areas are made with one point in view; i.e., the prevention of the spread of disease, with the consequent advancement of the live stock industry.

The cattle tick would not be under the control that it is today were it not for the restrictions placed on the movement of cattle infected with the fever tick. If regulations had not been adopted, and quarantine lines established, the probabilities are that a greater portion of the United States would now be infested, instead of the ticks being confined to a few counties in the Southern States.

The eradication of tuberculosis in cattle could never have reached the stage that it now holds had not a few states taken the stand that they did with regard to the importation of tuberculous animals. The same thing can hold true of contagious abortion; and by contagious abortion I mean that form of infectious abortion caused by the Bacterium Abortus. (Bang.)

Cattle breeding in Georgia is really in its infancy. While cattle of a nondescript breed have been raised in that section for many years, the buying of high grade cattle and the breeding and building up of good herds of cattle has taken place within the past 10 or 14 years. With the introduction of better cattle from the older breeding states, we have frequently found ourselves the victim of sharp practices by unscrupulous dealers. When in 1912 we insisted on buying cattle only from those who guaranteed them against a retest for tuberculosis in 60 or 90 days, we were considered radical. Today it is considered a reasonable requirement. Any veterinarian or experienced stockman knows that no greater disaster can befall any young breeder of high grade cattle than an outbreak of contagious abortion. In my opinion, contagious abortion is by far the most menacing cattle disease that we have to deal with. I would rather that a herd of cattle of mine have tuberculosis than to become infected with contagious abortion; few, if any, breeders would take issue with me. Dr. Butler, in his address before this Association last winter, made the following statement in support of my contentions: "Abortion disease, without doubt, causes a greater loss to livestock than any other disease. That the losses from this disease are not being decreased cannot be denied." If the losses are not being materially decreased in sections where the disease is prevalent, why not prevent further loss by confining the disease to these particular areas? In the case of an outbreak of fire, precautions are taken to protect surrounding property as well as to save what is possible of the burning buildings.

We all know that the cattle breeder is not in the business as a pastime. He is in the business for the gain or profit that can be gotten out of such an undertaking. With the dairyman, his living is derived from the milk that he sells. The beef cattle breeder depends upon the
annual calf crop and herd increase for his profits. To stop the production of calves in either instance breaks down the entire structure. The young breeder has not the experience nor capital to weather a series of losses, so naturally he quits the business.

The State of Georgia needs livestock and those in the business down there cannot afford to take heavy losses. It is up to the Georgia Bureau of Animal Industry to protect the interests of her cattlemen. We can't expect other states to look out for our interests. Georgia is a buying state. We can't expect a selling state to protect us against its unscrupulous cattle traders and veterinarians.

During the recent Foot and Mouth outbreaks in California and Texas, nearly all states issued quarantine regulations in self defense. No one waited for California or Texas to issue such quarantines.

Comparatively speaking, Georgia has but little contagious abortion. I believe that the infected herds can be counted on the fingers of both hands. Personally I know of only about eight herds. I may not have all of the herds listed, but we have been getting fairly accurate reports from the Dairy Inspectors, who are under the supervision of the State Veterinarian, and from private practitioners. It is the business of the Dairy Inspectors to visit all dairies in the State as often as the rounds can be made. Among the questions asked, is whether or not there is abortion in the herds. When abortions of a suspicious nature are reported, a blood test is made on the herd. If this test results in the finding of infection by the Bacterium Abortus organism, the herd is quarantined, instructions are given with regard to the cleaning up of the herd, the prevention of further spread of the disease, and at frequent intervals retests are made to locate subsequent infection.

Many critics have argued that an animal may recover from the disease and thereafter be valuable as a breeder. Such an animal may be of great value in a herd in which the disease exists, but is an untold detriment in a free herd. Practically every herd in Georgia now infected, can show that the infection was caused by the introduction into the herd, either directly or indirectly, of an animal from outside the State. Quoting from Dr. Schroeder's paper given in 1919, he says, "it is imperatively necessary in this connection to bear in mind constantly that the seemingly healthy carrier of abortion bacilli, the cow which shows no sign of her infected condition and calves in a seemingly normal manner, may be a superlatively dangerous disseminator of abortion germs at and shortly after her time of parturition." I believe this cow is just as dangerous now as she was in 1919, and to place her in a herd of young susceptible heifers will play havoc with that herd.

How is the third or fourth buyer going to know that this cow is a carrier without some kind of a test?

Some hold the view that many valuable animals will be shut out of Georgia due to this regulating of traffic. I can't see how an animal can be considered so valuable if she is going to cause the loss of calves and result in the sterility of animals, the value of which, would be equal to many times her intrinsic worth. I contend that Georgia can better afford to go on without such animals. I believe she will still hold her own in the live stock shows.
Georgia regulations, controlling the importation of cattle infected with contagious abortion, were instigated at a meeting of leading stockmen of the State, which was held in Macon in July, 1923. The order, known as Special Order No. 52, went into effect on the first of September of that year.

Practically all Georgia cattle breeders have made the statement that this order should have been issued several years ago; that they would have been much better off, financially, had such regulations been in effect sooner. One cattle owner claims that the infection has cost him at least $5,000.00, due to having, unknowingly, picked up the disease a few years ago. This cost is increased several times over; taking the state as a whole.

At the time the regulation was adopted, steps were taken to install a laboratory to take care of this work in Georgia. Some states have complained that they are not in position to comply with Special Order No. 52. When this complaint was brought to me by one of the Georgia breeders, I told him that, inasmuch as that particular state was not equipped for the work, and was not able to get the test made, so as to comply with our regulation, that he would probably find just as good cattle in some state that could and would comply.

Contagious abortion should be classed with tuberculosis and Texas Fever. If it is practical to control the spread of these diseases, then the control of contagious abortion should be just as practical.

In Bulletin No. 201 of the Missouri Experiment Station, the following paragraph is given "The South is destined to be a great market for many years for purebred breeding cattle from the North; and the cattlemen of that section will be unwise indeed if, after the labor and expense they have borne for so many years in getting rid of Texas fever, they do not take adequate precautions against the further introduction and spread of the Bang abortion disease." Georgia and South Carolina have taken this precaution; and it is hoped that the Northern States, and other states selling cattle into that territory will co-operate with us in holding this disease under control.

PRESIDENT FERNEYHOUGH: The next, concluding this subject, is the report of the Committee on Contagious Abortion, Dr. C. P. Fitch, Chairman. (Applause.)

REPORT OF THE COMMITTEE ON ABORTION.

Wednesday Afternoon, December 3, 1924.

The control of bovine infectious abortion as now carried out in the different states, varies according to the local conditions. Hygiene and sanitation properly applied and rigidly enforced, are still the bulwarks against the invasion and ravages of this disease. Two states have adopted regulatory measures to prevent the introduction of the disease in cattle purchased and coming into the commonwealth from other states. These regulations require a health certificate stating that the blood of the animal has been tested serologically and that no evidence of infection by the Bang organism was found. The test must be carried out in a laboratory recognized as official by the respective state authorities. Regulatory control of this infection is still in its experimental stage.
Those states which have adopted such measures are so situated and the cattle industry is so constituted within their domains, that they are well chosen to try out the effectiveness of such control. Our program today is planned to bring this matter before you for a free and frank discussion from which the advantages and disadvantages of such measures should be clearly brought out. Your committee desires the association to consider the necessary co-operation which must exist between the breeder or owner of cattle, the veterinary practitioner, and the regulatory official, before effective measures for the control of this disease can be accomplished. The papers presented today should show certain things which are necessary in order to carry on the most effective work to combat the spread of this infection.

Further your committee wishes to call your attention to the fact that the regulatory measures now in effect, depend upon the serological tests for their efficiency. These tests have been carried out for many years but in this country, at least, it has been quite recent since they have been employed on a large scale by practitioners. The following table of the number of examinations of blood samples submitted to one laboratory, illustrates the increased application of these tests:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of samples submitted</th>
</tr>
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<tbody>
<tr>
<td>1920</td>
<td>128</td>
</tr>
<tr>
<td>1921</td>
<td>340</td>
</tr>
<tr>
<td>1922</td>
<td>632</td>
</tr>
<tr>
<td>1923</td>
<td>1437</td>
</tr>
</tbody>
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One of the drawbacks in the application of these tests, has been the difficulty of interpreting the results. Even now we are unable to adequately apply the knowledge gained through the serum tests for abortion. Your committee desires to warn the association against attempting to use the same basis of interpretation and application as is used in the tuberculin test. As further knowledge is gained through careful research, we have learned that a positive reaction to the serological tests is not definite evidence that an animal has aborted or will abort, but it is evidence that the animal has been or is infected with the abortion germ or sometimes in the case of suckling calves, that the individual is absorbing the anti-bodies through the milk. It must be kept clearly in mind that the act of abortion is only one, but the most prominent symptom of infection with the Bang organism; and occasionally that there are other causes of abortion.

The serological tests are not perfect. Neither are other tests which are in daily use. The serum tests for abortion as carried out in different laboratories, have shown some variation even on blood from the same individual. Work is now underway to determine the cause of such differences and to bring about uniform results. We desire to emphasize that the serum tests afford one of the most reliable methods of determining the presence of the infection.

The results of the serum tests are influenced by the use of living vaccines and bacterins. Animals injected with these products give a positive reaction for variable lengths of time. The effect of the living cultures extends over a greater length of time than the bacterin and sometimes a positive reaction remains during the life of the individual.
The effect of the bacterin on a non-infected animal usually subsides after a period of three months and the serum again becomes negative. The general application of biologics in the control of infectious abortion, would, to a large degree, render the serological tests of little value and consequently regulations which depend upon such tests would also be very materially affected. Biologics cannot yet be recommended for the universal control of bovine infectious abortion. They are still in the experimental stage.

WARD GILTMER,
M. F. BARNES,
H. PRESTON HOSKINS,
J. W. CONNAWAY,
C. P. FITCH, Chairman.

PRESIDENT FERNEYHOUGH: According to our program, this subject is now open for discussion. There will be no more important subject presented to you, in my humble opinion, and I hope you will be free to discuss it.

The first on the program to open the discussion is Dr. T. E. Munce, State Veterinarian, Harrisburg, Pa. Is Dr. Munce here? (Not present) We will then hear from Dr. W. J. Butler, State Veterinarian, Helena, Montana.

DR. MARSH: Dr. Butler was unable to come down to the meeting and he asked me to read his discussion. This discussion represents, partly, my ideas, too. We talked it over before he wrote it up so I understand the material that is in it, but I am simply going to read Dr. Butler's paper as he wrote it.

(Dr. Marsh read Dr. Butler's discussion.)

DR. W. J. BUTLER.

Read Wednesday Afternoon, Dec. 3, 1924.

I believe in the use of the complement fixation and agglutination tests in the control of abortion disease in individual herds, and in definite districts where we have a definite history of the individual animals and herds; but at the present time, and under existing conditions, I believe a compulsory agglutination, or complement fixation test in regulating interstate traffic in abortion disease, is neither advisable or timely.

These tests are admirable aids in the detection of abortion disease. However, they are not perfect. There is still much room for improvement in their application.

It is the duty of regulatory officers to use business as well as scientific methods in the control and eradication of live stock diseases. When one studies the sanitary regulations of the various states, he is appalled by the lack of uniformity in such regulations. Every state in the Union has different regulations. I agree that geographic and climatic conditions warrant different regulations in different sections, but with adequate Live Stock Sanitary Boards, and with the U. S. B. A. I. organized as it is at the present time, there is absolutely no necessity for the diversity of regulations that exist at this time.
We must use every reasonable precaution in controlling abortion disease, but a compulsory complement fixation or agglutination test in the interstate traffic of live stock, I consider unreasonable, and especially so, when we do not have adequate regulations within our own states for controlling and eradicating the disease.

There are very few clean areas in the United States. If we ship susceptible non-reactors into infected areas and herds, such animals are very apt to become infected and set up a virulent type of abortion in a herd where the disease may exist in the non-virulent form. In this way we may exclude non-susceptible animals that react and admit susceptible animals that will cause greater harm and loss by their becoming infected.

We cannot afford to promulgate regulations that we cannot enforce in such a manner as to benefit the live stock industry. We know that neither the agglutination or complement fixation test for the B. abortus Bang is diagnostic for vibrionic abortion. Some of us may believe that vibrionic abortion is not serious and that an animal affected with this type of abortion disease does not become a carrier, but we must take into consideration the fact that Theobald Smith has proved that there is a vibrio that causes abortion in cattle.

We, in our own work in Montana, know that a vibrio, which we believe to be the same as described by Stuart Stockman, does cause abortion disease in sheep. If abortion should be due to a vibrio as well as the B. abortus Bang, we will lay ourselves open to criticism in requiring a considerable expenditure of money, time and trouble on the part of cattle shippers in enforcing a regulation that is of questionable value.

It is possible that an animal may give a positive reaction to either of these tests and still not be a spreader, although Schroeder’s splendid work on this phase may ultimately prove that an animal that gives an agglutination in less than a 1 to 200 dilution is not a spreader. We must also bear in mind that there may be certain stages of the infection where the diseased animal may fail to react and that such non-reactor may be a carrier and spreader of the infection.

What will we do with reactors, and the herds from which they originate? If we regulate by quarantine the chances are we will have to quarantine every herd, of any size, in the United States. What are we going to do with shipments from public markets? Will we trace down the herd infection in every case? If we do we will have to abandon, on account of limited finances, many of our other important works in the control of live stock diseases. If we do not trace the source of infection in all cases, then we will be unfair in requiring herd quarantine in some instances, and not in others.

If we promulgate regulations requiring tests of this questionable character, it will mean that the public and stock interests will judge all our work along this line and that would probably mean the condemnation to the much laudable work now being carried on.

I am of the opinion that education is the paramount issue in controlling abortion disease,—not only the education of the public and stock grower, but the education of ourselves. In this direction, I believe
that the federal government and the various states should appropriate, wherever possible, adequate sums to be expended by our research workers in carrying on their work to determine a preventive for abortion disease. We veterinarians should educate live stock growers to protect clean herds by buying only cattle that pass a negative agglutination or complement fixation test, and otherwise protect their herds by observing strict sanitation, and maintaining separate maternity stalls wherever possible. If their herd is not clean, then I believe that they should gradually cull out and slaughter non-breeders and isolate animals which give a positive reaction to either the complement fixation or agglutination test for the B. abortus Bang as well as the vibrio of abortion.

Sanitary requirements, education and practical regulations capable of being enforced, will do more to control this condition than the promulgation of impracticable regulations which cannot be impartially enforced.

PRESIDENT FERNEYHOUGH: We will call on the modest and conservative State Veterinarian of St. Paul, Minnesota, Dr. Cotton. (Applause.)

DR. C. E. COTTON: Gentlemen, I certainly don't feel qualified to discuss this question from the scientific standpoint, but I do feel we should congratulate the scientists, particularly the Committee on Abortion, on the fact we are finally getting some practical results from the committee. We have had a Committee on Abortion Disease for the last fifteen years. Prior to three years ago the reports from the standpoint of control were nil. But in the past three years we have had reports in which they have all agreed that one thing we must adhere to is sanitation, isolation and common-sense methods.

I can't understand the argument presented by the gentleman from Alabama making the control of this disease on a parallel with our control of tuberculosis. I do not think that stand is justified at the present time.

We do know we can eliminate tuberculosis from an individual herd. We do know we can eliminate tuberculosis from a number of herds and from an area. Until such time as you can show us you can advance to the same condition in the control of abortion disease, I do not feel we are justified in undertaking to depend on serological tests, which the scientists all agree are not standardized, to regulate the transmission or transportation of cattle interstate.

The live stock industry of this country depends a great deal on the control methods of the various states. It is our duty to protect this industry. Let us use some common sense and go a little slow before we undertake to put up any more barriers that are not justified at this time. I thank you. (Applause.)

DR. C. A. CARY: I want a point of correction. He said Alabama, and I think he meant Georgia.

DR. COTTON: Absolutely.

PRESIDENT FERNEYHOUGH: We would like to hear from Dr. Wilson.

DR. H. A. WILSON: Mr. President, and Gentlemen: I don't know why they should put me on this discussion, for all of the counsels and
innumerable valuable bits of knowledge which I do not possess, I know the least of all about contagious abortion. In that respect I do not believe I am unlike Edgar Allan Poe, the night he received the inspiration to write Arabia. I do not believe I am alone. I am going to attempt to discuss this subject for two or three minutes, and I am going to be very much like a certain gentleman from Dr. Cotton's state who was in the limelight a few years ago, and whose greatest achievement is being able to milk a cow, and whose constituents showed, in the last election, their utmost admiration for him by leaving him at home.

(Laughter.)

He, at one time, so the story goes, was a member of the Minnesota Senate, I believe? Is that right?

DR. COTTON: Yes.

DR. WILSON: He got up to discuss a subject before the House. It was some bill. He talked a long time, and one of the other members of the Senate asked permission to interrogate the gentleman. He yielded to interrogation. The member said: "What are you talking on? Which side of the question are you on?"

"Vell, I just don't know. I just bane talking."

That is what I am doing. I am just bane talking a little bit.

It doesn't appeal to me as though there is a consistency throughout the land on the subject of contagious abortion. We have about forty-eight experiment stations. The government experiment station makes forty-nine, and we have about forty-nine different opinions. Some say they get good results from biological products. Others say the same results would have been obtained if the biological products had not been used.

If I go down on the Ozarks in Missouri and crawl back in a cave where there is a still running, and go to sleep, and some government man comes along and finds me there watching the still, there is no argument, gentlemen. I go to the hoosegow, that is all. (Laughter.) I was running that still.

On the other hand, if you go out here and use biological products in fifteen or twenty herds of cattle, whose owners are losing a great deal of money, and are being inconvenienced by the ravages of abortion, and you get 60 or 70 per cent, or any other per cent, of good results, are you going to say it would have happened just the same? If that is the attitude we, who are supposed to be scientific men, are going to take on the subject, the whole medical fraternity from the human allopathic down to the human chiropractor be damned. There is nothing to it. We, each year, hear the same old yarn—segregation and sanitation. I am not talking against it. I think they have their places, but are we going to keep on in the same rut? Are we going to find out anything about contagious abortion? If we are, let these four gentlemen get together, and if two of them can agree on one subject, then put that out as authentic facts for the rank and file of the veterinary profession of the United States and the rest of the world to go by. If they can't agree, then continue in the same chaotic, befuddled, bemuddled situation we have been in the past.
Then, as regards regulations such as Georgia and South Carolina have, I don't know whether that is very timely at this particular time or not. Understand I am not criticising you who have regulatory jobs in Georgia and South Carolina. You know as much about this condition as anybody else, and if you think you can keep contagious abortion out of your state by demanding animals be non-reactors that come in there, I think you are perfectly justified in doing so.

However, I think, as a personal proposition, it is a little bit impractical as a whole throughout the country. It delays shipping. It takes time to get these blood samples and send them to the laboratory. Then, again, if what we have been told is true, which personally I don't believe, that contagious abortion is not a disease contracted through sexual intercourse, but contracted by ingestion of food, then what account is a serological test on one individual out of an infected herd? It doesn't amount to that, because how do you know but what the day that that blood sample was sent away the cow ate the afterbirth of another cow? So you are only in the same position in that case that an ostrich is when he hides his head in the sand. I am like Johnson. I am just bane talking. I can't entertain you gentlemen any longer. I can't tell any stories because of the presence of the lady. (Laughter and applause.)

PRESIDENT FERNEYHOUGH: Is there anyone who would like to discuss the subject? I want you to feel perfectly free.

DR. J. W. CONNAWAY: I would like as a member of the committee to make a few remarks on one paragraph of the report, which as it stands may be misinterpreted. The paragraph—"warning the Association against comparisons between the Bang abortion disease and tuberculosis, etc." It wasn't the intent of the committee that we should not draw analogies between these two diseases and point out their great similarities, and within proper limits to act wisely upon these analogies—because there are very close analogies between these two diseases that are applicable in control measures—but to emphasize the fact that we do not have to use such drastic measures for control of abortion.

We don't have to kill valuable reactors, if it is desirable to keep them for breeding. We have one in our own herd which was bred on the farm. She aborted three calves, her first, second and fifth, but has had several living calves of merit. That cow has been a persistent reactor from her first abortion in 1913. And, during the present year, the Bang bacillus was isolated from her milk. Moreover, her afterbirth fed to a pregnant non-reactor induced the specific abortion reaction but has not yet caused abortion. We believe the infection in this long-time "carrier" has become mitigated. Such a cow, however, should not be for sale. Her breeding career should be ended on the farm where she contracted the disease. No risks should be taken of starting an outbreak in a clean herd by the sale of such a cow.

If I were writing regulations, however, I would not bar the sale of non-reactors, though they come from herds badly infected with the Bang abortion disease, no more than I would bar the sale of non-reactors to the tuberculin test from tuberculous herds—a practice now followed. A
proper regulation requiring the abortion test would not hurt the legitimate traffic in breeding cattle one iota. It would help greatly the legitimate trade.

The value of the serological tests in controlling the Bang abortion disease has recently been called in question by writers in one of our veterinary journals. Allow me therefore to say a few words in further support of the reliability and practical value of the tests, not only as an aid for research purposes, and for cleaning up individual herds, but also to prevent the spread of the disease from state to state.

It is being used in Wisconsin. It was recommended by Dr. Hadley, in a recent bulletin, as a very efficient and reliable means of detecting this disease. He is using it there in cleaning up the disease from the herds of that state. They are doing the same thing in Minnesota, probably, and they are doing the same thing in Michigan.

Dr. Hudelson, in a publication a year or so ago, commended this test very highly. He said that in his opinion it is as good for its purposes as the tuberculin test is for its purposes, and work is in progress in that state of cleaning up the herds.

Dr. Cotton of Washington, collaborator with Dr. Schroeder in his magnificent work, says the unsuspected carriers are the worst of the lot, because you don't know that they are carriers, and the only way you can tell that they are carriers is by this test. This test is not perfect, but I believe it is just as perfect as the tuberculin test.

Some of my friends may not agree with me on this, but we have been using this test for a good many years. We have been helping the stock breeders of Missouri in cleaning up their herds. We have been making tests for them.

Just recently a veterinarian sent me six blood samples, without telling me what they were from. Three of these were reactors and three were non-reactors. The report which came in to us later was that these three reactors had each aborted a calf, while two of the others which had several calves had never aborted, and the last one of the group was an unbred heifer which, of course, we wouldn't expect to have any infection.

So for all practical purposes in cleaning up herds, this test as it stands, if we were never to make it better than it is, would be a very valuable means in cleaning up these herds.

As to the improvement of, and establishing of uniformity in the test, we have three committees working on it; one that is appointed by the A. V. M. A.; one by this Society, and one by the Association of the Veterinary Experiment Station Research Men, and we hope to present to you by this time next year at least a uniform method by which we can all report the results in a uniform manner. That, I think, will be a very desirable thing to do and one that will remove a great deal of the criticism which is now put upon it.

I may mention that in an article which appeared in the North American Veterinarian, the November number, there was an editorial statement referring to an address which was given by Dr. C. H. Case before the Pennsylvania Association, which declared: "The serological test is
not a dependable means of diagnosing abortion disease of cows, having found; like Dr. C. P. Fitch and his co-workers in Minnesota, that samples of the same blood sent to different laboratories invariably bring different readings."

He also cites some foreign work which I will not take the time to read. He further says (this is the editor speaking): "In view of these facts and the well-confirmed reports of Schroeder and Cotton that the mammae eliminate the B. abortus from two to seven years after aborting, it would seem that the practitioner is little justified in placing dependence upon this means of diagnosis at this time, and that the endorsement of laws restricting the importation of untested cows is, to say the least, premature police work.

"The danger of passing the stamp of purity to dangerous carriers of the disease, as well as the danger of condemning valuable breeders, seems too great to justify the enactment of laws based solely upon the readings of a test which practitioners and laboratories of unquestioned ability pronounce impractical and unreliable."

This article will have a tendency to discredit these tests which we know are reliable, not perfect, but, in the main, reliable in the minds of practitioners and in the minds of breeders, and I want to correct that false impression. The work which Dr. Fitch has done there, he states, has been rather misrepresented. I will let him do his own talking on that.

During the past summer Dr. Fitch wrote and asked me if I would test some samples he would send to us. He was checking up between different laboratories. We were glad to do it. We carried out those tests. We may have gotten some bad results, but to carry out this experimental work we like to recheck things. I asked him if he would test out some we would send to him, and he was glad to do it.

So we drew some samples—quite a large amount from each of about twenty-two head of cattle—and we let the serum separate of itself without any extra manipulation in the way of centrifuging or anything of that kind by which we might introduce elements of error from contaminated glass-ware, or other means, and we sent these clear samples in bottles which we knew were clean.

We sent one set of twenty-two samples to Dr. Fitch. We sent a duplicate set to Dr. Giltner's laboratory, and the results of these tests, in every case in which a definite result was obtained, were exactly alike. We used the complement fixation test. Dr. Hudelson in Michigan, in Dr. Giltner's laboratory, used the agglutination test. Dr. Fitch used both tests, and the only discrepancies in this were in the complement fixation test as carried out by Dr. Fitch. One of the bottles was broken and, of course, no test was made. In four samples there were anti-complementary substances and no definite test made. But even in this case, if he had made a retest, as would be the proper thing to do, and used that test only, he probably would have reached the same results that the Michigan laboratory reached.

We have a further check: The samples in this test were taken from three different herds. One group was from a beef herd that had been badly infected for a few years and the records of which we knew.
One of these was a yearling calf; another a two-year-old that never had been bred and whose dam was a negative. Those two, in all of these cases, were negative.

Number 3 of this group was a six and one-half year old cow that had two live calves and aborted one. All of us found that cow a positive reactor by these different methods.

Number 4 was a four-year-old cow that had aborted twice and given no live calf and has been a reactor since June, 1921. We all found her a positive reactor.

Number 5 was a two and one-half year old heifer that had never been bred and has been negative since her birth. All of us found this heifer a negative animal.

Number 6 was a 9-year-old cow with six live calves to her credit and two aborted. All of us found this cow a positive reactor. This cow calved in 1916, 1917, 1918, 1919, 1920 and 1922. She aborted in 1921 and 1923. She reacted in 1919 and 1922 following the abortion and has been a reactor ever since.

Number 7 was an 8½-year-old cow; had three live calves; never has aborted, but her first calf was a premature calf. This animal was infected experimentally. She has been a positive reactor for six years. We have obtained the infection from the milk of that cow. She is still a carrier and a probable spreader of the disease.

I have three cows, Nos. 8, 9 and 10, following right along, all of which these laboratories found negative. One was a 2½-year-old old heifer that has not been bred. Another was a yearling which never had a calf, but which had a dam that was positive. This heifer has become a negative animal and we expect her to stay negative because we have found that you can raise healthy calves from these reactors. We can't do that so well with tuberculosis.

Cow No. 11 was a positive reactor by the tests of all these laboratories. Her first calf was premature from a subcutaneous injection.

Number 12 was a negative animal. This was a young animal that has been bred. The dam of this cow was negative, but the grandmother was a positive animal. So we have come down here to the third generation from a positive cow and have two generations that are negative.

Number 13, which was an 8½-year-old, is one of a like history. This one has had three calves; has not aborted, but she is a distributor of the germs. At least we find the germs of the disease in her milk, and in the feeding of the after-birth of one of these cows to a heifer we produced the reaction in that heifer. The heifer didn't abort, because she was far along in pregnancy and carried her calf full time.

Then follow two others, Nos. 14 and 15, which were negative. Both were young animals whose grandams were positive.

Number 16 is one that aborted from feeding the germs. It was an experimental animal which had aborted from feeding. This animal, although an 8½-year-old cow, has had only one calf. She aborted her first calf and was sterile a long time, and then had a calf. So one of the bad features of this disease is the sterility that goes along with it.
Number 21 is one I want to call your special attention to. This is a 14-year-old cow. She has had nine living calves. She aborted three times.

PRESIDENT FERNEYHOUGH: Pardon me, Doctor, but I will have to cut this discussion short because we have to complete our program.

DR. CONNAWAY: It will just take me a few minutes longer to complete what I have to say.

This cow aborted her first, second and fifth calves. She has been a reactor since 1913. For a long time we tested this cow every month. Occasionally a reaction fails. That is one of the drawbacks of the test, but not serious even in practical use. There are some cows that will have negative phases, but we know the drawbacks of the test and can guard against the faults. There is no serious difficulty in the way of applying the test for interstate work.

Many states, at the present time, think they cannot carry out this test, but I wish to state this as my belief, that every state in which the dairy industry is at this present time highly developed, has all of the machinery to carry out this work very well.

An old friend of mine down in Georgia wanted to buy a cow in some herd in New York. He wanted her tested for this disease. Dr. Moore's laboratory made the test and found the cow negative, and that man is happy. Every other state, like Minnesota, Michigan, Wisconsin and Missouri, has all of the machinery right now to do this. We have the laboratories. We have the trained veterinarians who are doing the tuberculin tests now and can draw samples. It is simply a matter of getting together and co-operating and carrying out this test.

Just one word on range conditions. I lived out on the ranges one time. I am not entirely a tenderfoot. I spent some time in California on a big ranch and I know some of the conditions. In the range country they cannot carry out all the sanitary measures which are feasible for this region. It is impossible. In my opinion, their main salvation is in this test, in this respect: to keep out of that region new infections—fresh infections. If you will keep from renewing with new strains, the old infection, in time, will become less virulent. Most of it will go to the butcher market in the natural course of trade, for many of the range aborters will become sterile, and be eliminated, and in time you will have bigger calf crops on the ranges than you do now. It is one of the best things to do to put up the bars against the further introduction into the range country of infected animals which are going there now, and which Dr. Marsh of Montana has told me are going. (Applause.)

PRESIDENT FERNEYHOUGH: He reminds me of an old lady that was just about to pass away. She hadn't spoken for quite awhile. There was some talking going on in the next room to her. One of the old ladies who was visiting her said to the nurse, "Stop that noise in the next room. It is going to disturb the sick patient."

It seems the little girl in the next room said, "I can't kiss you." This sick lady for the first time in several days spoke. She said, "Oh, no. Let
the lovers alone." An old colored lady said, "Thank God, old Mrs. Mundy is going to die in her right mind and stand for the right thing." (Laughter.)

We are going to have a most interesting paper read to us by Dr. V. A. Moore, Director Veterinary College, Cornell University, on "Rabies and Its Control." I am sure this will be a treat.

Dr. Moore, we would like to hear from you. ( Applause.)

RABIES AND ITS CONTROL.

By V. A. Moore, N. Y. State Veterinary College, Ithaca, N. Y.

There is no other specific disease, affecting man and beast, that is more dreaded than rabies. On the other hand, there is no other specific malady that more often has been denied the recognition of an existence than this. These two extreme views are blending gradually into a rational conception of a disease that is produced by a definite virus; that exists to a greater or less extent; that is spread in a perfectly natural manner; and that can be controlled, if not entirely eradicated. When the essential facts pertaining to its nature are recognized generally the difficulties heretofore encountered in its control will disappear.

As sanitarians, it is well to recognize that people must understand in a general way the necessity for the enforcement of preventive measures and the reason for them. Before the public can be reconciled to regulatory supervision of their pets, the physicians and veterinarians, who are their immediate advisers, must understand the problem. We have witnessed outbreaks of rabies that were prolonged and the number of cases multiplied because the professional men were as skeptical and bewildered concerning the malady as the laymen themselves. Such a circumstance reminds one of the blind trying to lead the blind.

Historically, rabies was among the first specific diseases to be recognized and described. Aristotle defines it and Virgil, Horace and Plutarch mention it. The name hydrophobia was assigned to it by Cornelius Celsus in the First Century and Galen applied numerous remedies with little or no success. Baulings in 1591 mentions its prevalence among wolves. In Europe many serious epizootics are reported. It was brought to America in the latter part of the Eighteenth Century, where it spread gradually throughout the United States and Canada. Thus we find through a history of more than twenty centuries tracings of its appearance, exemplifying the essential characteristics of a specific, infectious disease.

The cause of rabies has been a subject of much speculation. Pasteur pointed out that, whatever it is, it gained entrance to the tissues through wounds and became localized in the central nervous system. In 1903, Professor Negri discovered peculiar structures in the cytoplasm of certain brain cells and suspected them to be of etiological value. These bodies, now known by his name, are believed by many students of this subject to be its cause, while others are still in doubt. The recent description by Manouillian and Viala of structures in the nerve cells designated Encephalitozoon rabiei are not yet clearly differentiated from certain forms of Negri bodies. Without detracting from the valuable results of many other workers it can be said truthfully that to Pasteur
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and his co-worker, Emil Roux, we owe much of our present knowledge of the nature of rabies.

In recent years little new knowledge has been acquired concerning its syndrome. It is characterized by a long and variable period of incubation, followed by symptoms referable to the nervous system and terminating in paralysis and death. Very few cases recover. It does not produce gross lesions by which a positive diagnosis can be made. It affects all species of animals, although canines suffer most. As the disease is transmitted by inoculation through the bite of rabid animals, the infected dog is the chief cause of its spread. It is not necessary to dwell on the symptoms of rabies or morbid changes associated with it as they are described fully in modern textbooks on infectious diseases of animals.

From the prevention point of view the diagnosis is of first importance. It is difficult or impossible to determine positively its existence from the symptoms, notwithstanding the glycosuria pointed out by Porcher or the pin point contraction of the pupils mentioned by Coakley. They are not always easy to determine and further they are said to be absent in some cases. The changes described by Babes and Golgi are often hard to find. The cellular proliferation in the ganglia pointed out by Van Gehuchten and Nelis is not always in evidence when the suspected animal is killed early in the course of the disease. It was shown by Frothingham that these changes might occur in one ganglion and not in another. The subdural or intraocular inoculation of rabbits, or other animals, with a suspension of the brain, is not satisfactory because of the time required, especially when other animals or people have been bitten. These were the only means available for diagnosis until the discovery of the Negri bodies. These soon came to be regarded of great diagnostic value. At present their detection in a brain is considered positive evidence that the animal is infected with rabies. It has been shown that they may appear in advance of recognizable symptoms. If they are the cause this would be expected.

Further evidence of the reliability of Negri bodies in making a diagnosis are the results obtained in many laboratories where animals have been inoculated with brains that contained them and those in which they could not be found. In our experience brains containing these bodies have invariably produced rabies and those in which we could not find them did not. Like results have been obtained in other laboratories. I believe, however, that Negri bodies may escape detection microscopically and the brain still contain them. A few rabbits and guinea pigs inoculated with brains giving negative results on microscopic examination have been reported to have developed rabies. The papers by Negri, Williams and Lowden, Frothingham, Remlinger, Standfuss and others on the studies of Negri bodies are very instructive.

The technical methods for finding Negri bodies are clearly defined in our laboratory manuals and well understood by the workers. The justification for making a positive diagnosis on their presence also seems to be established. It is recognized, however, that great care should be exercised always in doing the work. From the control point of view, a long step in advance has been taken with the development of a method by which the diagnosis can be made quickly and in time to
permit those who have been bitten to take the preventive treatment and to enable sanitary officials to enforce precautionary measures before secondary cases develop.

An inquiry into the prevalence of rabies in the United States reveals the fact that it is a more formidable destroyer of life than is generally supposed. The literature shows that before Pasteur's discovery of a preventive treatment it was the cause of many deaths, especially in France. In this country prior to 1890, there seems to be little or no statistical data relative to its prevalence, excepting statements that at different times serious outbreaks appeared. Dr. Salmon made a careful inquiry soon after the establishment of the Bureau of Animal Industry in 1884 and found that it appeared in practically every part of the country. The census for 1890 reported 143 deaths in man, scattered over 30 states. Kerr and Stimson found that in 1908, 111* people died of rabies in the United States and 534 localities were infected with it. The states having the largest number of infected areas were Wisconsin, Illinois, Virginia, Maryland, Delaware, New Jersey and New York. The losses among domesticated animals in Wisconsin was estimated by the state veterinarian to be 584 individuals, consisting of 400 cattle, 100 hogs, 56 horses and 28 sheep. In 1917 Mr. E. W. Nelson, Chief of the Biological Survey, U. S. Department of Agriculture, made the following statement relative to rabies in connection with the damage caused by predatory animals:

"The damage done by predatory animals has been vastly increased by the prevalence among them of rabies. This disease spread from the point of origin in Oregon into the states of Nevada, California, Idaho and Utah. Cattle and sheep were destroyed in large numbers and hundreds of persons were bitten. As a result of the campaign conducted by this Bureau in cooperation with local authorities and stockmen, the spread of the disease has been checked and the conditions have been greatly improved. It is believed that with a continuance of the work complete eradication of this alarming disease among wild animals of the affected states can be accomplished."

If we pass to a more recent date we find that Dr. T. F. Sellers, Director of the Georgia State Board of Health Laboratories, found in 1921, rabies to exist in 29 states, and that a total of 5,558 heads were examined, of which 2,699 were positive. He learned also that there were 168 deaths in man from 1917 to 1921. Of the total, 39 died during and after the Pasteur treatment.

At the meeting of the American Veterinary Medical Association in August last Dr. Eichhorn presented a paper on this subject. He had gathered data by means of a questionnaire sent to state boards of  

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*The difficulty in obtaining accurate data on this subject is illustrated from the fact that a letter from the United States Public Health Service under date of September 29, 1924, giving the figures from the Bureau of Census on this subject, states there were 88 deaths in 1911 due to rabies. It is not unlikely that the discrepancy occurs because of many individual physicians and veterinarians who make the examinations themselves and the private laboratories where a considerable amount of the work has been done, and which may not be included in the official data.
health. He tabulated the data given in the 34 replies which he received, a summary of which is presented in the appended table. Mr. McCoy of

Rabies.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Positive Examinations made in State Laboratories</th>
<th>No. of Persons Given Rabies Treatment</th>
<th>Human Deaths</th>
</tr>
</thead>
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<tr>
<td>1920</td>
<td>1506</td>
<td>3350</td>
<td>25</td>
</tr>
<tr>
<td>1921</td>
<td>2006</td>
<td>4567</td>
<td>35</td>
</tr>
<tr>
<td>1922</td>
<td>2522</td>
<td>6041</td>
<td>34</td>
</tr>
<tr>
<td>1923</td>
<td>2705</td>
<td>6110</td>
<td>37</td>
</tr>
</tbody>
</table>

the United States Public Health Service states that in 1922 the admittedly incomplete enumeration for the year showed a little less than 10,000 persons taking treatment.

Recently rabies has been more prevalent in the Southeastern and Southwestern states than elsewhere in the country, although there are several restricted areas where it has been very common. Twelve years ago it prevailed quite as extensively in the Northeastern part of the United States. From the data we have been able to gather relative to its distribution, it is quite conclusive that it is still widespread, appearing here and there almost in epizootic form and spreading from one place to another rather slowly. Its dissemination in New York State, outside of New York City, from 1898 to 1923 is both interesting and instructive. At first there were a few cases in the Hudson River Valley. In Albany they increased steadily for about two years and a few cases appeared in the surrounding counties. Gradually it extended westward, following the main highways and railroads, establishing foci of intense infection in the larger cities. It radiated from its main course westward, north and south, again following the usual routes of travel. The number of examinations increased from a very few in 1898 to 588 in 1908, when there were 295 positive cases. The number gradually declined until 1923 when there were 36 examinations, with only four positive ones. Recently a somewhat serious outbreak prevailed in Detroit.

While the data relative to human rabies is quite exact, that pertaining to the loss it occasions among farm animals is very indefinite. We are told frequently of the death of a few horses, cattle or other animals from this cause. It was estimated, a few years since, that in one county in New York, farm animals valued at $4,000.00 died from this affection, but the grand total is lacking. It appears from correspondence that the records on this subject are very incomplete. It is clear, however, that this disease takes a heavy toll annually.

We are interested most in the control, or rather prevention, of rabies. This involves one or both of two difficult, but perfectly rational, procedures, namely: keeping the virus away or immunizing against it. As natural infection takes place through inoculation from bites of rabid animals, its spread is limited to the extent animals and people are bitten by those already affected. It is stated, however, that the virus may be transmitted through bites several days before symptoms
appear. As the dog is the only domesticated animal with a natural tendency to bite, the control of rabies in dogs circumscribes the problem. There is a large literature, however, on rabies in wild animals, but in the greater part of the thickly populated sections of this country its spread by such animals can be considered negligible.

The protection of dogs against infection by keeping them confined or restricted by a leash or muzzle has been, and still is, the usual method in this country. Such quarantine was inadequate for many years because of the small area included. Later when the restrictions extended as far or beyond the wanderings of the rabid dogs, it became more efficient. The most important factor in the quarantine is to have the people intelligently informed and willing to support the regulations. A prompt diagnosis, the destruction or isolation of exposed (bitten) dogs and the elimination of the stray and homeless canines have been effective agencies for the rapid, local elimination of rabies. They have been, and are, applied under some form of regulation, in practically every state.

It is clear with a disease which has a long and variable period of incubation, and in which the virus is transmitted from infected to uninfected dogs through bites, that it is difficult to control it entirely by quarantine, although good results have followed when properly administered. From its nature, the disease may die out entirely in the absence of human interference. With the application of the general principles involved in disease control and the enforcement of an annual dog license which removes the homeless individuals, there seems to be no serious difficulty in keeping rabies under subjection.

The Pasteur treatment for its prevention was found to be troublesome and too expensive to be practical for immunizing dogs, although it is reported to have been employed successfully in some kennels. Farran experimented with unmodified fixed virus, while Hogyes used repeated injections of a dilution of a fixed virus. Later, a single injection vaccine method for prophylaxis in dogs was developed, beginning with the work of Semple in 1911 on phenolized virus which suggested an additional and more effective means for controlling the disease. The effort has been to secure a vaccine that was efficient in immunizing, and cheap enough to be applied as a practical measure. Umeno and Doi produced a vaccine by keeping an emulsion prepared by grinding the central nervous tissue of a rabbit dead from a fixed virus in a mixture of 60 parts of glycerol and 40 parts of 154% phenol for two weeks at room temperature. They reported that in 104,629 dogs in Tokio and Yokohama that were treated with this vaccine only 41 cases of rabies occurred, while 1699 cases appeared in the unvaccinated group.

In 1915, Oshida demonstrated that an emulsion of fresh fixed virus could be employed to immunize dogs against rabies. Kondo has made extensive studies on a single vaccine for animals prepared from the brain of rabbits inoculated with a fixed virus and exposed to different temperatures. He found that "37°C. for three days would confer solid immunity on dogs." This vaccine was used on 20,117 dogs in Hokkaido, Tokio and ten other prefectures from June, 1919, to February, 1921, and with the exception of four dogs that died within a week from the natural
infection before vaccination, no cases of rabies among the dogs vaccinated were reported. Kondo makes the following summary:

(1) "Of various vaccines which were prepared and tested on animals in the laboratory the one prepared by incubating the emulsion of the brain and cord from animals infected with a fixed virus at 37°C for three days, or that prepared by keeping the emulsion at room temperature for ten days, is most applicable for the vaccination in the dog.

(2) "The vaccine prepared by incubating the emulsion at 37°C. is better than that prepared by keeping it at room temperature because more uniform attenuation of the virus could be expected in the former treatment.

(3) "As the source of the vaccine, the brain and cord of the dog are better than those of the rabbit because the yield in the former is six times more than that in the latter.

(4) "In the dog the vaccine is to be once inoculated subcutaneously in doses of 5 cc.

(5) "The immunity produced by the vaccine lasts for but one year."

A large amount of research work on a single vaccine has been done in this country, and several of the "Biological Houses" have placed a single vaccine on the market. The control of rabies by prophylactic vaccination is receiving much attention. There are at least a few—and perhaps many—who would welcome a uniform law compelling the annual vaccination of all dogs. As there are several ways of preparing the vaccine, it is not clear whether it contains virulent, attenuated or dead virus. These are essential points relative to the danger involved in its use that should be determined and understood fully before the vaccine should be recommended generally. The employment of unaltered fixed virus has many potential dangers.

A second point that needs to be determined is the efficiency of the method in protecting dogs against subsequent infection and the danger, if any, of their developing the disease from the use of the vaccine. The Japanese reports are very favorable. A large amount of experimental work on this subject carried out under the direction of Dr. Eichhorn at Pearl River, N. Y., and Dr. Reichel at Glenolden, Pa., shows that dogs can be protected by a single injection of vaccine against a fixed virus. A few experiments that were made in my department showed that the vaccinated dogs survived inoculation, while the controls developed rabies. Statements from several health officials indicate that the vaccination of dogs has given excellent results. They do not mention the normal incidents of rabies in the communities.

On the other hand, we are told by a few laboratory men and sanitary officers that dogs that have been vaccinated, and later exposed, developed rabies and died. Dr. Mohler writes that experimental work in the Bureau, not yet published, shows that the vaccine would protect against two strains of street virus, but would not against a third. Dr. Church, Deputy State Veterinarian of Pennsylvania, writes us of several unfavorable experiences with the vaccine method.

A further point to be determined is the length of time the immunity lasts. The Japanese do not place it beyond a year. It is too early to have reliable data on this part of the problem. Fortunately we do not
have any community in the United States where the normal incidence of rabies is sufficiently high so that the vaccination of 50% of the dogs would give any information of value on this point. We will have to determine this factor experimentally, which is not easy to do on a sufficiently large number of dogs to render the results trustworthy.

From the evidence available on the efficiency of the single vaccine method, it is not possible to draw final conclusions as to the best procedure. It would appear, however, that the following could be accepted as tentative until more convincing evidence justifies a different plan:

1. That the practice of early diagnosis and the enforcement of proper quarantine be continued in all communities where rabies may appear.

2. The small normal incidence of rabies in the United States and the success of well known precautionary measures for its control do not justify an annual, widespread, compulsory vaccination of dogs.

3. In communities where rabies may appear, the vaccination of the dogs would be an additional precaution and should be recommended, together with the enforcement of the other precautionary measures.

4. The experience with the single vaccine in this country does not warrant health officers or live stock sanitary officials in relying solely on vaccination for stamping rabies out of any local community.

5. The degree of success that has been attained experimentally in producing a vaccine for immunizing dogs against rabies in this country and the practical success in Japan give much encouragement that a single vaccine method may be developed that will be efficient in preventing this most dreaded of diseases.

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PRESIDENT FERNEYHOUGH: We have one more very important paper and after this paper, then the last two papers will be open for discussion.

"Some Shipping Problems Affecting the Practitioner," will now be presented to you by Dr. W. H. Welch, Lexington, Ill. (Applause.)
SOME PROBLEMS OF TRANSPORTATION AFFECTING THE PRACTITIONER.

By W. H. Welch, Lexington, Ill.

The practitioner is the connecting link and represents the actual point of contact between the regulatory service and the live stock industry. He it is who usually furnishes to the proper authorities the first information concerning the existence of a contagious or infectious disease that may menace a live stock community. Likewise, upon him, in a majority of instances is placed the responsibility of enforcing certain rules and regulations made mandatory by regulatory officials, and his manner and attitude, at this time, in tactfully explaining to the owner the "Whys and Wherefores" of each regulation deemed necessary in preventing the further spread of said epidemic, has very much to do in securing the hearty co-operation of that individual, without which Regulatory officials usually find themselves greatly handicapped in suppressing a communicable disease. The efficiency, therefore, with which an outbreak is quelled, as well as the popularity of the entire regulatory service, rests largely in the hands of the practitioner, and between these two agencies, which may be likened to a "board of health" for the live stock industry of our nation, there should at all times exist the heartiest loyalty in co-operation.

The transportation of live stock affords many problems of mutual interest to the practitioner and regulatory officials. Because of affording a wider range of selection to prospective purchasers, custom has, in this age, developed the central commission market as the ordinary channel through which pass practically all animals produced and sold from the farms and ranches of our entire commonwealth. Our cattle and sheep are grown to suitable ages in the grazing districts of our nation, and after being assembled at some central market, are reshipped to the grain belt, where they undergo a varied feeding process ere they are once more transported by our railroads to the abattoir. Our horses and mules, reared on the farms and ranches, are maintained and do service there until maturity, when they also find outlet through the central markets, whence they are redistributed to the various sections of our commonwealth having need of the services of such animals. Some certain marketing centers oftentimes become well-known as catering to, or demanding, certain types of animal for which they are at all times willing to pay a premium, and this condition results in there being a considerable purchasing and shipping from one market to another by dealers. It is therefore possible, although not entirely probable, that a horse raised in a distant Western State might be sold consecutively through the markets of Ogden, Utah, Grand Island or Omaha, Kansas City, Chicago, Buffalo, and New York, Boston, or Philadelphia, or even be finally exported to a foreign country before finding a permanent home. In fact, it is by no means an uncommon occurrence for a percentage of these individuals to pass through two or three of these commission markets before he finds a purchaser with a suitable job for him. A somewhat similar circuitous route may be followed by certain types of cattle ere they reach a final destination. This multiplicity of shipments seems
unavoidable because prospective purchasers can rarely be attracted to
the farms or ranches where the animals are produced, hence, this cus-
tomary form of disposal usually means at least three freight bills, two
commissions and a certain percentage of sickness and fatalities charge-
able against the profits of these animals before they reach a final mar-
et, or the abattoir.

With that phase of shipping relating to the financial, we as veteri-
narians have little interest. That the two or three consecutive shipments
does serve as an additional drain on the vitality of the animal, and render
him much more susceptible to disease, is a well-known, undisputed fact.
The sudden change in environment from the tranquil comforts of a
quiet home life, into all the vicissitudes of a shipping experience, is
nerve racking and health wrecking at the very best, to all classes of
animals. With nervousness and dejection written on features that ex-
press the very personification of homesickness, new and startling ex-
periences are constantly being encountered. At home, his meals have
been served him regularly, and these have usually been succeeded by a
comfortable period of repose; now, however, he is fortunate if he be
permitted to grab off a meager lunch once in every thirty-six hours,
while such a thing as rest is entirely unknown from the time of leaving
home until his shipping experience is ended. In this hungry, exhausted,
and nerves racked condition, his vitality is greatly depleted and should
he become exposed to any communicable disease, he proves an unusually
susceptible subject. It is a lamentable fact, however, that many times
we discover that exposure to infection has already occurred previous to
shipment, the seeming well animals having been selected from an in-
fected herd and consigned to market in an effort to salvage the most
from what might otherwise prove a total loss. At other times, whole
herds of sick animals are loaded aboard the cars and sent to market.
Quite naturally these animals may infect all the various premises through
which they pass, beginning at the time they leave the farm, and ex-
tending to the local stockyards; the cars in which they were conveyed;
the yards of the central marketing place; and if they are purchased for
further feeding in the country, the contamination reaches another car
used in their transportation, and another stockyard as well as the
premises of their new owner. From these centers of infection thus
created, ramifications extend into new local territory, and many times
are responsible for epidemics that become widely spread, and seriously
affect the live stock industry of a given locality.

It is because of this that the practitioner becomes concerned with
transportation problems. A load of horses purchased through one of
these commission markets is sold at public auction in this community,
and immediately that locality is beset with an outbreak of "influenza," "
distemper," "contagious pleuroneumonia," or other diseases of an
epizootic character. A load of cattle arrives from a marketing center, and
carries "hemorrhagic septicaemia" to the native animals on the pur-
chaser's premises, or proves the source of origin of an outbreak of "hog
cholera" on his farm. Sheep and hogs are likewise carrying their trou-
bles to the home premises and the time has arrived when practically
all classes of animals passing through any of the various stock-yards of
our country must be considered and treated as a menace to the entire live stock interests of that locality, and a rigid quarantine must be enforced by the new owner, if he hopes to prevent infection of his native animals.

Until recent years, the various respiratory epidemics of horses and "hog cholera" constituted the bulk of these shipping troubles, but in the past decade, these have paled into insignificance as compared to "hemorrhagic-septicaemia," which has become a very familiar term to stockmen, who have learned through experience to anticipate its appearance with every purchase of cattle, sheep or hogs, arriving at their farms after passing through any of these marketing centers. Since 1917, this disease has played havoc with the feeding industry, for it has become the exception that animals are able to undergo a shipping experience with its accompanying trip through an established market without the purchaser sustaining a serious loss from this source. At times, during periods of inclement weather, results have been appalling among those weak, scrawny young animals, whose vitality and powers of resistance have already been greatly reduced by reason of the usual mistreatment incident to their railroad journey. Again, although no deaths may occur, the loss of flesh, and the percentage of "ne'er do wells" that fail to give a proper return for the amounts of feed consumed, destroys any possible chance of profit in the feeding venture, while frequently the infection is carried to his native home animals and the whole family is caused to mourn the loss of their favorite cow. Without fear of successful contradiction, I venture to assert that during recent years, stockmen have sustained greater annual losses because of this one trouble, than they have undergone by reason of any changes in prices that so many times prevent feeding operations from becoming remunerative, and it is a discouraging element that is causing many farmers to cease marketing their grain through live stock.

Somewhat recently, for a period of one year, the Bureau of Animal Industry undertook an experimental relief measure by attempting the immunization of these "feeder and stocker cattle" previous to their leaving the yards by administering to them "hemorrhagic-septicaemia bacterins or vaccines." Only the owners who requested this had their cattle so treated, while a charge of 10 cents per head to defray the actual cost of the vaccine was made, the government receiving this fee from the Live Stock Exchange, who collected it from the purchaser. My understanding is that a charge of 20 cents per head is now being charged, and that while the work is supervised by the B. A. I. the treatment is administered by a veterinarian not in their employ. Just what data are in possession of the Bureau relative to this experiment I am unable to state, but I cannot believe that it has been at all satisfactory, although perhaps it may have lightened the individual attacks and lessened the death rate to some considerable extent. However, these cattle, so treated, still came to the country, undergoing their customary sickness with now and then a fatality, and still conveyed the disease to home animals, thus producing new centers of infection. That many of these consignments were several days on the road, having been unloaded in various infected yards, and that infection may therefore have antedated by sev-
eral days the administration of the vaccine, combined with the fact that but one injection of bacterin was used, is perhaps responsible for the high percentages of failures to properly immunize these animals. It seems a well demonstrated fact, that under ordinary field conditions, a successful prophylactic treatment with any bacterin requires two or more periodical administrations of that biologic. The necessity for the repetition of this treatment, with increased dosage, after the arrival of the cattle at their home, could and should have been emphasized to the purchaser, and failure to do so was unfair to him as he did not realize the value and necessity of a repeated treatment, as well as depriving his local veterinarian of a large volume of business that would have greatly benefited his client. In conversation with several different shippers and feeders, I learn that the bulk of their knowledge relative to the merits of this particular form of vaccination has been usually derived from their commission man, who in no single instance has been reported as having advised the stockman concerning the value of a second treatment with the bacterin. The word “VACCINATION” in the stockman's vocabulary means, to him, immunization, and when his commission man suggests to him that it would probably be a profit procedure for him to have his cattle vaccinated for “hemorrhagic septicaemia,” since the cost is so trivial, he cheerfully agrees, and ships them home with the firm belief that they are now fully protected against that disease. When, after his cattle have arrived at home, he finds that he still has sick ones amongst them, and that they still transmit it to his home animals, is it any wonder that he loses faith in the whole procedure, and more readily turns a listening ear to some disgruntled county agent, or farm periodical, if they perchance should deride the veterinarian?

It is of course, quite unnecessary to enter upon any lengthy discussion of the various diseases that are so frequently contracted by our domestic animals, during a railroad journey. Contagious ophthalmia is at the present time perhaps the second place of importance to the cattle industry, and while there are usually no fatalities, the accompanying depletion in flesh, and the probable loss of some eyes, causes it to merit all earnest efforts of our regulatory forces to prevent it. Since the establishment of the first commission horse market, all dealers in that commodity, patronizing that institution, have become so thoroughly accustomed to what is commonly designated as “shipping fever” that it is considered a disease that necessarily accompanies every shipment. It matters not whether it be “influenza,” “distemper,” “contagious pleuropneumonia,” “laryngitis” or some of the various sequelae, such as “purpura hemorrhagica,” “laryngeal hemiplegia,” “infected tendon sheaths” or what not, it all means “shipping fever” to a dealer, and if his animals “go through it” lightly, he is well pleased, and if he loses one or more out of a load, he figures that “it can’t be helped” and lets it go at that. All dealers purchasing their supplies at central commission markets of this character estimate that the financial loss chargeable to said sickness approximates twenty per cent or more, a perfectly appalling toll to the operator in that industry. Most of these dealers have at various times tried out practically all suggested immunization plans, but have been ultimately disappointed, because sooner
or later in the face of the excitement and exhaustion incident to their shipping journey his horses have sickened just the same, and destroyed such faith as might have formerly existed concerning the value of any serum, bacterin, or sero-bacterin form of immunization, and he has abandoned all attempts at vaccination as a useless expense. The cattle and sheep men are fast approaching that position, and they cannot be greatly censured for their conclusions. The remedy for these various infections contracted during a shipping journey, lies not in medication, but rests largely on sanitation as the only logical preventive. So long as such unsanitary conditions are permitted to exist in our various stockyards and market centers, no form of immunization can be expected to function with a very high degree of perfection. Millions of dollars are annually being exacted from the horse industry of this country (approximately one-fifth the value of all animals passing through a commission market), and yet we, as sanitarians, stand idly by, and see the premises through which these valuable animals are handled disinfected not more than once or twice a year, unless for some very special reason, a clean-up is ordered in some particular department. Our “feeder and stocker” division here at the Union Stock Yards is cleaned and thoroughly disinfected only about four times a year. Only stock cars known to have carried live stock affected with contagious or infectious diseases are subject to being cleaned and disinfected. Chutes, pens, etc., which are known to have received animals affected with contagious disease, are temporarily put out of use until disinfected, but no attention whatever is paid to hog cholera, and no effort is made to maintain either yards or cars free from hog cholera infection. Seriously, how can we conscientiously permit our grain-belt farmer to purchase and transport the supply of animals calculated to consume his grain, be they cattle, sheep or hogs, through such cesspools of infection? Are we, as sanitarians, that constitute the “board of health” whose function it is to protect the live stock industry of our nation, doing all that is possible along this line? It is not possible to devise a better plan of sanitation that will improve these conditions?

Let me say frankly, that it is not our central markets alone that must be incriminated in the spreading of these infections. Our local country stockyards, through which is weighed and exchanged a percentage of our live stock, remain infected from year to year with never a move toward their disinfection. When hog cholera attacks a farmer’s herd, if they be of marketable size, his first thought is of the livestock dealer, and after sorting and disposing of everything possible, the veterinarian is then called to treat the remainder of his herd. We have a State law in Illinois relative to this procedure, but no attention is ever paid to its enforcement, either by local or higher authorities. Sick hogs go to market constantly, and no attention seems to be given to the disinfection of the cars or yards known to have been occupied by them. Subsequently, a farmer purchases a load of “feeder cattle” which are transported to his town in one of these infected cars, and within two weeks, in addition to “hemorrhagic septicaemia” in his cattle, his hogs become affected with “cholera.” A hobo rides an “empty,” and dropping off in a country district makes a house to house canvass for his
meals, and an outbreak follows his visit, while even flies may travel a long distance by freight, and perhaps prove a source of origin. Many times it is necessary that a shipper clean out the filth and freshly bed a car before it is fit for use, and this infected debris is simply dumped out along the track to be tramped back onto various premises in that locality. There is the man who assists his neighbor in hauling his hogs to market; another who purchases a horse or milk cow that is sold at auction at the country stockyards; while perhaps the greater percentage of sales from neighbor to neighbor are weighed through these infected local country stockyards scales, all of which practices constitute a menace to the health of animals in that vicinity. Our livestock interests are annually suffering a toll from this source that is appalling, and justifies the statement that the public stockyard constitutes the greatest financial hazard that the live stock industry is called upon to endure.

The question naturally arises, "What means can best be employed to prevent these losses?" Immunization, in the face of exposure to such virulent virus, at the time when animals are in a weakened and debilitated condition incident to shipping, can never attain to any degree of perfection. Sanitation, not medication, presents the only logical solution of this problem. Suppose that we begin at our local stockyards, clean them of all litter; fill up all hog wallows, and grade them so that they will drain properly, taking care that one pen does not drain into another. Then twice yearly a heavy application of road oil will keep these yards from becoming muddy and filthy as they so often do. This, followed by a systematic disinfection of scales, chutes and fences at stated periods, or when known to have been occupied by animals affected with a communicable disease, should help some, would it not? Do you not believe that the time has arrived when it should be compulsory to thoroughly clean and disinfect every stock car after each shipment? The small expense connected with this operation could well be borne by the shipper, since he would profit greatly because of this regulation.

When we consider the fact, that on practically all steers as well as on a very large proportion of the cow stuff that reaches the abattoir, the railroads will have received four different freight bills during the life and distribution of the carcasses of those animals, it forces us to the conclusion that they (the railroads) can well afford to establish a better protection to that industry by maintaining decent, sanitary conditions in their various stockyards. Most of our steers are grown on Western ranges. At the proper age, they are sent to a central market of the Middle West, whence they are again shipped to the corn-belt farmer. When properly fattened, they are consigned to the abattoir, and after death, the railroad receives its fourth freight bill for delivering the carcass to the consumer. The same thing is practically true concerning the sheep industry: four freight bills received by the railroads during the mutton making and distribution process! At least two freight bills can be safely charged on the expense account of every horse leaving our farms. Yes, the railroads can well afford to give better sanitary protection along these lines discussed; in fact, the additional freight they would receive on animals now dying as a result of stockyard infections, that otherwise would have been returned to market, would go a
very long way toward defraying the expense of better sanitation. A
more rigid inspection should be maintained at the unloading chutes of
our various markets, and all sick or suspicious shipments of cattle,
sheep or hogs should be consigned to a segregated section of the yards,
from which they should not be permitted to make their exit, except for
the abattoir, with perhaps some exceptions under rigid restrictions that
would in no wise affect other consignments. Our sales barns, through
which horses or mules are bought and sold, should by all means under-
go a systematic disinfection at least every two weeks, while the pub-
lic watering trough at those places should be entirely abandoned. Such
lack of sanitation as now prevails in these places is very unfair to that
great industry, and merits our earnest efforts toward improvement.

In conclusion, let me say, that my observation and deductions refer
to my home state of Illinois, and I plead ignorance regarding conditions
in most of the other states. If they are better than ours, mentioned
here, then accept my congratulations; but granting that this be true,
then permit me to ask, "Why, such inconsistency on your part?" You
in your state compel my state to furnish you with a health certificate
and a certificate of vaccination for every hog sent you, but you will ac-
cept them out of a car in which sick hogs rode to market only the day
before. You demand of me that all cattle sent you be tuberculin tested,
and in good health, yet I can load them into a car that but yesterday
transported a load of tuberculous cattle, or were sick with hemorrhagic
septicemia—and you will accept them. You require of me a certifi-
cate of health and a "Mallein test" on every horse sent into your state,
and how should I know, or how could you know, that only yesterday an
old gray mare purchased from a gypsy rode to market in the same car
into which your horse was loaded, and that this same old gray mare
had glanders. When state veterinarians issue the edict that all stock
brought into their state must come in thoroughly disinfected cars, un-
less consigned to the abattoir, a wonderful day will have arrived for the
livestock industry of our nation.

Let me again ask "Has the time not arrived when it should be com-
pulsory to thoroughly clean and disinfect every stock car after each
shipment?" Is it not time that we also should adopt as our slogan,
"Clean out, clean up, and keep clean."

PRESIDENT FERNEYHOUGH: We have seldom had, and I doubt
we will ever have, two more instructive and interesting papers at this
institute, in this assembly, than we have had in the last two papers by
Drs. Moore and Welch.

I should like to call on Dr. Eichhorn to say something on Dr. Moore's
paper.

DR. A. EICHHORN: I can't offer anything in discussing Dr
Moore's paper. We all know Dr. Moore is sincere in his statements, and
surely his paper particularly showed he is very conservative in his rec-
ommendations as far as vaccination is concerned. However, I know the
conclusions that Dr. Moore has recommended, that in the control of rab-
ies to exercise the quarantine measures and other restrictions which
might be forced for the suppression of the disease. One thing I noted
in my investigation on the control of rabies in different parts of the
country was that wherever the disease appeared in the localities where it was most prevalent no quarantine measures whatsoever had been enforced.

I have, in preparing material for a paper, sent a questionnaire to every state board of health in the United States in which I have requested information as to the number of cases of rabies which occurred in dogs since the year of 1920 to 1924, the number of persons bitten by proven rabid dogs, and the number of persons compelled to take the Pasteur treatment, as well as the number of actual deaths occurring in people from rabies. This data which I have collected has proven conclusively that rabies is on the steady increase in all parts, I might say, of the United States, but particularly so in the South. This is, no doubt, due to the fact while they might have measures which are intended to control the disease in animals, nevertheless these measures have not been enforced. So we have quite an increase of rabies which has actually been recorded officially.

Only about a month ago I attended a veterinary meeting in one of the southern states and rabies was discussed among the men quite freely. In the course of the discussion one man asked the veterinarians who were compelled to take the Pasteur treatment to hold up the right hand. Eight out of thirty-two of the veterinarians were compelled to take the Pasteur treatment at least once, and some of them twice. In view of this, I believe, we should look towards more definite means of controlling the disease.

We know quite well in the localities where it does exist, the measures which have been enforced heretofore have not yielded the results, not because they are not satisfactory. I agree perfectly that if they could be enforced probably that would be the best way of suppressing and possibly eradicating rabies, but I don't think any of you know of any locality where such measures are effectively enforced.

The conclusion further states the vaccination will have to be proven out by further experiments. We can go the limit with vaccination until the time when we will have more proof. At the present, I believe the vaccination could never be applied for the control of rabies. We have a tremendous extensive use of this method in Japan, and I am told that over 200,000 dogs have, I might say, been successfully vaccinated there. Therefore, I believe the work there alone, together with the experimental work, and also as far as the actual using in the United States, justifies the use of this means of control.

I don't want to leave the impression it will be possible within a short time, even by compulsive vaccination, to eradicate rabies, but, nevertheless, if the vaccination is effective, which I personally believe it is, then we can at least control it in certain localities where the disease is very prevalent. Furthermore, a certain sense of security, and not only a sense of security but actual security, will then be enjoyed by the owners of such vaccinated dogs.

If we take the number of persons who are compelled to take the Pasteur treatments annually in the United States which, I believe, is close to 20,000, and if you stop to consider they have to be given twenty-
one injections or twenty-five injections each and go through the anxiety, whether they will be immunized or not as the result of the examination, you can readily see that anything which will have any assurance of reducing the number of cases of rabies, and thereby reducing the number of cases of persons who will have to take the Pasteur treatment, I think, is justified. I would not recommend the vaccination at all if I did not have some assurance we might attain better and quicker results than by any other means which we have practiced heretofore.

With regard to the safety of the vaccination, I think Dr. Moore justly called attention to the fact whether it might not be possible to cause sometimes some ill effects, directly as a result of the vaccination. But in connection with this, I might say, there are today and I could name at least a dozen or more veterinarians who have vaccinated from 1,000 to 3,000 dogs not only once but for two or three different years now, and have not experienced any ill effects as the sequel of the vaccination.

If it is possible to develop this thing with the assistance of live stock sanitarians or veterinarians, or any one interested in the suppression of the disease, I think we should not stop, but go ahead, and I don't believe experimental work will teach us more than we have at the present time. Only practical experience will show whether it is possible to control and eradicate disease by means of vaccination. (Applause)

PRESIDENT FERNEYHOUGH: Is there any one else who would like to say something? If not, we will pass to the next paper.

Dr. Moore, is there something you want to say?

DR. MOORE: I hope I didn't leave any wrong impression about this vaccination or about the prevalence of rabies. I readily admit there is more rabies in some sections of the country now than there was a few years ago, but there are other sections where there is none now that had a good deal a few years ago.

As far as the number of human cases is concerned, back in 1911 we found 111 deaths in man, according to the report from the Public Health Service, and in the last four years, according to Dr. Eichhorn's paper, who was courteous enough to show me a reading which has not yet been printed, the number was as follows: 1920, 25 deaths; 1921, 35 deaths; 1922, 34 deaths and 1923, 37 deaths. There was a little increase in those four years, but I think we have a disease that crops up and goes down.

I feel I am justified in making the statement that there are sections in the country, in several states, where the enforcement of quarantine is pretty carefully carried out. The question is, educating the people so they will submit to the requirements of the regulation, but in a good many sections the trouble is rabies disappear, as I found in New York state. Four to ten years ago we had a lot of it. We may have more in the future but in that time they will forget about the past experience. That is the difference. I can't see that rabies, on the whole, is increasing to any great extent in this country. It is in certain localities, but not on the evidence. The total number doesn't seem great, as near as I can find out.
Mr. McCoy, of the Public Health Service, states their incomplete enumeration for 1922 shows a little less than 10,000 people who took the Pasteur treatment. You all know a great many people take the Pasteur treatment who have really no occasion for it. If they are bitten by a dog, they are nervous. This doesn't mean they have all been bitten by a dog and proven rabid. It is a precaution.

I believe if we can get a vaccine that will help, that we can depend upon, we ought to use it. A single life is worth saving. The results reported by men who used the vaccine don't justify us in depending upon it, but we can use it for what it is worth. I believe that is the position you ought to take.

PRESIDENT FERNEYHOUGH: Dr. Cotton, I would like to have you say something about Dr. Welch's paper.

DR. COTTON: Mr. President, and Gentlemen: It seems to me we ought to be ashamed of ourselves as control men when a general practitioner has to come here and tell us our failures. He has given us a wonderful paper and a practical one. I am satisfied that all of us deserve the censure.

In our work in the control of tuberculosis we will come to the conclusion we are not going to get anywhere by simply eliminating the disease from the herds, until such time as we thoroughly clean and disinfect the stable and place the stable and barnyards in sanitary condition.

The stockyards, particularly our public stockyards, and the commission men on the large exchanges have been protecting themselves with the purchasers by means of this vaccination.

In Minnesota we have had a regulation which required that young stock which left the Union Stock Yards to any point in Minnesota must be given one dose of the bacteria. The commission people and the people interested gradually impressed upon us the necessity of increasing the margin of the regulation until it covered not only the springer cattle but the older animals, because of the fact the cattle shipped to the yards to go out to points in Minnesota later, carried and developed hemorrhagic septicaemia on the farm. We extended the regulation to cover springers. It is a wonderful insurance to protect the stockyards interests and the exchange if we continue to give the one dose.

Personally, I am of the opinion that the vaccine has no virtue whatever unless it is given prior to the time the animal enters the yard, particularly in the young depleted animal that lays around the yards for two or three weeks before it is shipped out in the country. Perhaps, on the animals that only stay in the yards one or two days and get one dose, it has some effect, but the point the doctor brought out, that the single dose is not sufficient, is certainly an important one.

We have a number of instances where one dose of vaccine was administered before shipment; not only did some of them die, but carried the infection to the cattle on the farm. The point I wish to bring out is what the doctor gave us and put stress on it. We should extend our rules so that not only cars that bring non-tuberculous cattle and animals known to be infected to the yards, be disinfected, but that all cars must be cleaned and disinfected as well as the public stockyards which are
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I will modify that, however, by saying some of the yards where there are animals known to be infected are disinfected more frequently. If we could succeed in getting these stockyards to clean and disinfect weekly, we would go a long ways in controlling some of the so-called stockyards infection, and not depend upon the apparent insurance to the business by one shot of the bacterin before the animals left the place.

PRESIDENT FERNEYHOUGH: Is there any one else who would like to say something on either of the papers?

DR. COTTON: I would like to hear from some member of the Bureau relative to the work gotten out by Dr. Miller.

DR. MILLER: We carried on an experiment with bacterins in three of the public stockyards last year. We treated about 153,000 head of cattle and the results, to say the least, were inconclusive. I am rather in accord with both Dr. Welch and Dr. Cotton that the results were hardly worth while. I might say we are now conducting an experiment with hemorrhagic septicaemia. Both of these cases undoubtedly would give better results if they could be used in the country before the animal goes to the yards. I doubt whether any one who has had much experience with the bacterins and with the aggression would dispute that statement. I believe we did reduce somewhat the death number in the animals treated. Dr. Welch covered that pretty well, although he made one statement, I think, that there was no disinfection of cars that contained cholera at all. Of course, we all know that all hog cholera is not detected, but whenever our men find a car that contained cholera infected hogs that car is cleaned and disinfected. Of course, we know that doesn't catch all the infection, but it gets a very large share of it.

The cleaning and disinfection of public stockyards is quite an undertaking. I supervised the cleaning and disinfection of the Chicago yards three times in 1914 during the outbreak of foot and mouth disease. We hardly got over the yards in a week. I don't know what you would do with the live stock. You wouldn't get over one in one week, and you wouldn't get a chance to market the live stock in the interim.

The cleaning and disinfection of cars is another most difficult problem to handle. In either 1918 or 1919 there was a bill introduced in Congress to require the cleaning and disinfection of all stock cars each time used in the interstate shipment of live stock. That bill never saw a light. It didn't get out of the committee's hands. The opposition came from practically every district in the country. They were united—starting with the farmer in the country and going down the line. Until you can educate those agencies I don't believe you are going to get any general regulation or law that will require the cleaning and disinfection of all the cars, although I subscribe to most everything Dr. Welch said. He brought up some abuses that are evident. We have been doing all we can to enumerate them but they are gigantic. (Applause.)

PRESIDENT FERNEYHOUGH: I think it is in order to vote on the adoption of the report from the Committee on Contagious Abortion. It has been thoroughly discussed. It was a splendid report and care-
fully gotten up. I believe it has been moved and seconded that we accept the report. Are you ready for the question? (The motion was unanimously carried.) Adjournment.

THURSDAY MORNING SESSION

December 4, 1924

The meeting was called to order at 9:30 o'clock by President Ferneyhough.

PRESIDENT FERNEYHOUGH: We have to change our program somewhat owing to the absence of some of the members who can't be with us.

According to the Good Book, the last shall be first and the first shall be last, so this morning we are going to start with the last. Dr. Grim can't be with us, so Dr. Bruner is going to read Dr. Grim's paper.

We will be glad to hear from you, Dr. Bruner. (Applause)

Dr. Bruner read Dr. Grim's paper entitled "Several Uncontrolled Factors Frequently Associated with the Commercial Process of Pasteurizing Milk."

SEVERAL UNCONTROLLED FACTORS FREQUENTLY ASSOCIATED WITH THE COMMERCIAL PROCESS OF PASTEURIZING MILK.

By George W. Grim, V. M. D., Milk Control Officer Associated Suburban Boards of Health, Ardmore, Pa.

The process of Pasteurization was discovered by Louis Pasteur of France in 1864. It has been named in honor of its discoverer, who first recognized the cause of deterioration in fermented liquids. Fundamentally, it is a simple process consisting of elevating the temperature of a liquid by the application of heat for the purpose of destroying germ life. Pasteur confined his work to the solution of the problem of how to prevent spoilage in wine and beer.

Some years later Storch, in Denmark, while studying the effect of heat upon milk, discovered that the flavor of butter could be favorably influenced by the addition of a starter grown in milk that had been heated momentarily to 185 degrees F. The publication of Storch's results led to the development of a machine which rapidly elevated the temperature of milk. Ahlborn and Fresca of Germany both claim the honor of developing the first commercial pasteurizers, used in that country in 1880. During the early "nineties" the Flash heater came into general use in the creameries of Germany and Denmark.

About the same time Bang published his work upon the Tuberculin Test. The results of Bang's investigations revealed tuberculosis to be a widespread disease among the dairy cattle of Denmark. The Flash heater or Pasteurizer already operating in the Danish creameries made feasible the adaption of the well known Bang method for the control of bovine tuberculosis. In 1898 legislation was enacted in Denmark requiring that all products returned to the farm by the creamery for the purpose of cattle feeding be heated to a temperature of 180 degrees F.
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for the purpose of destroying the tubercle bacilli. This was probably the first legislation adopted for the purpose of controlling specific disease through the compulsory heating of milk.

In 1895 the Danish heater was introduced into this country by Reid, and placed in use in several dairies. The heating process was carried on secretly, the heater frequently being placed in an unfrequented portion of the building and operated without the knowledge of the consumer or the health authorities for the purpose of delaying souring. The process consisted of momentarily raising the temperature of the milk to a point somewhere between 140 and 165 degrees F. by rapidly forcing the milk through a heater and then cooling immediately. The concealment with which the dealer cloaked the process aroused the suspicion of the health authorities and the practice rapidly fell into disrepute. Today the Flash system is prohibited by law in most cities.

In the same year, 1895, Mr. Samuel M. Heuling built the first Continuous Flow Pasteurizer. In this apparatus the milk, after being heated, passed through a series of tanks in a continuous flow. The tanks were designed of suitable capacity to retard the flow of heated milk to such an extent that twenty minutes would be required for it to pass through the apparatus. A few years previous to this the first vat pasteurizers were developed. When in 1906 scientists announced that it was necessary, under laboratory conditions, to heat milk to a temperature of 60 degrees C. and hold it for twenty minutes in order to destroy the tubercle bacilli, no equipment was available to the dairy industry capable of effecting such a process. Since that time the development of equipment to bring about the commercial pasteurization of milk has been phenomenal.

The process of pasteurization as applied today consists of the following elements:

1—Heating.
2—Holding.
3—Cooling.

While milk control officials are of one accord regarding the duration of the holding period, a well defined difference of opinion prevails concerning the question of temperature. The Committee on Pasteurization of the International Association of Dairy and Milk Inspectors define pasteurized, in part, as a process whereby the temperature of milk during the holding period never drops below 142 degrees F. The committee report presented to the Association in October of this year refers to the work of F. W. Campbell Brown of England on "The Thermal Death Point of Tubercle Bacilli in Milk." The author concludes that "If a temperature of 60 degrees C. (140 degrees F.) is used it requires 20 minutes exposure to this degree of heat to prevent milk so treated causing infection to the guinea pig."

On the other hand, with the single exception of the work of Hart and Traum, no authoritative work has yet been published of a character to justify a conclusion that naturally infected raw milk might be rendered safe by subjecting it to a commercial pasteurization process wherein the temperature of the milk as recorded in the usual manner
by an accurate themograph indicates that the milk has been subjected to a temperature of 142 degrees F. for a period of thirty minutes.

Of the pathogenic organisms that occasionally find their way into milk the tubercle bacilli and certain strains of hemoletic streptococci associated with epidemic septic sore throat are apparently most heat resistant. The thermal death point of pathogens commonly found in milk has been made a subject for repeated study in the laboratory. From these studies it has been concluded that pathogenic organisms commonly found in milk may be killed in the laboratory at a temperature somewhat below 145 degrees F., providing the heat treatment is continued over a period of from 15 to 20 minutes. There is little information available concerning the effect of various temperatures upon pathogenic organisms when such temperatures have been applied in a commercial way to naturally infected milk during the pasteurizing process. The question of what is a safe temperature for commercial pasteurization must therefore resolve itself into the question of what is a sufficient temperature margin above the minimum temperature necessary to destroy the most heat resistant of the pathogenic organisms under laboratory conditions.

As a result of a questionnaire recently sent by the United States Public Health Service to health officials making inquiry concerning milk-born epidemics, forty epidemics were tabulated as occurring from the use of raw milk and four from the use of pasteurized milk.

Scientists of unquestioned ability in the dairy field, equipped with a thorough knowledge of milk-born pathogens derived from exhaustive researches over a long period of years, engineers having competent knowledge of the equipment and operation of the smallest as well as the largest commercial milk plants, and officials familiar with the frauds sometimes practiced in some commercial milk plants, all working in the interests of public health are agreed that the safety of public health requires that the minimum heat treatment to which milk must be subjected to effect pasteurization in a commercial milk plant is not less than 145 degrees F. for not less than thirty minutes.

Considerable objection has been raised against the 145 degree temperature requirement by a certain group of milk dealers who insist that a temperature of 145 degrees F. results in serious damage to the volume of cream that rises on the bottled milk. The other group of dealers appear to recognize an advantage in the higher temperature, and some have voluntarily adopted the practice of holding at 145 degrees F. for thirty minutes. In many cities the minimum temperature requirement for pasteurization is only 2 degrees in excess to that found necessary to render the tubercle bacilli harmless under laboratory conditions.

This paper deals with some of the uncontrolled factors associated with the commercial pasteurization of milk and in so doing indicates the necessity of maintaining a substantial margin of safety throughout the process by the enforcement of rigid standards of heating and holding.

Pasteurization equipment in common use is designed to accomplish two things:
A. To heat the milk to a certain predetermined temperature.
B. To hold the milk at approximately that temperature for a certain predetermined period of time.

The equipment usually consists of a heater which rapidly elevates the temperature of the milk and a holder in which the milk is held at the pasteurization temperature throughout the holding period. In many of the smaller milk plants the process of heating and holding is completed in a single vat or tank which performs the dual function of heater and holder. The attention of the health official engaged in supervising the pasteurization process is focused upon the holder because here is where pasteurization is effected.

Holders are of two types, positive and continuous flow. A positive holder is usually considered as one in which all of the milk undergoing the pasteurization process remains in a certain compartment for a definite period of time which ends when pasteurization has been effected. A continuous holder is one which permits the milk to flow through the apparatus in a continuous flow. This equipment usually comprises a series of two or more tanks. Milk heated to the pasteurization temperature is supplied to the first tank, from which it overflows to the second tank. The tanks are constructed with capacity sufficient to retard the flow of milk to such an extent that approximately thirty minutes are required for it to pass through the apparatus. There is another type of continuous flow holder which consists of a series of long tortuous pipes through which the milk is supposed to pass in thirty minutes.

Many continuous flow holders consisting of two or more vertical tanks are in use throughout the country. The milk passed through this apparatus is offered to the public as pasteurized. In most every instance some of the milk finds its way through this class of apparatus before the termination of the holding period. In the event that this so-called pasteurized milk contained pathogenic organisms before the heat treatment was applied there is every reason to believe that such organisms would pass through this apparatus and be present in the pasteurized milk. During the past summer the author, in company with S. M. Heulings and D. W. Horn, has had occasion to conduct efficiency tests upon two installations of continuous holders (1). Tests were made at the milk plant with milk at the usual pasteurization temperature. In one instance it was found that some of the milk passed through a continuous holder in less than three minutes. An efficiency test was conducted on a continuous flow holding system at a large milk plant furnishing the greater portion of the pasteurized milk supply for a city of 30,000 people. The results of this test revealed the maximum holding time of the system to be less than 18 minutes. For several years the milk from this plant had been sold to the public as pasteurized. Since the application of these tests the health department have required the dealers to install equipment capable of pasteurizing milk.

(1) Some experiments with holding tanks
Grim, Heulings and Horn, Milk Control District, Ardmore, Pa.
Proceedings Fourteenth Annual Report International Association Dairy and Milk Inspectors.
It would seem that the positive system of pasteurization holds forth the greatest hope for the upbuilding of a satisfactory commercial process. Such a process is not yet at hand. Heretofore a complete record of pasteurization has not been made at milk plants preparing milk for sale as pasteurized milk. The present design of milk tanks and vats with reference to the position of the thermometer bulb as placed in the milk is such that a record is simply made of temperature changes of the milk while the bulb is immersed. This fact is recorded upon a temperature chart. The record thus obtained is deficient in that no evidence appears on the chart of milk permitted to run out of the vat during the holding time provided sufficient milk remains in the vat or tank to immerse the bulb. The record is also deficient in that no evidence is shown upon the chart of milk flowing into the vat either during holding time or during the time in which the vat is emptying, should such milk be supplied at the pasteurization temperature.

When vats or tanks are used singly or in series in the so-called positive system of milk treatment the time recorded on the pasteurization chart, and referred to as the holding period, does not in any measure indicate the mean positive holding period of the milk undergoing treatment. In all cases, except where the temperature of the milk is lowered at the end of the holding period, the chart indicates not only the holding time but also the time required for the level of the milk in the vat or tank to recede during emptying to a point just below the bulb of the recording instrument (generally placed through the wall of the vat or tank nearer to the bottom than the top), making it under such conditions necessary for the health officer to venture a guess concerning what has actually happened to the milk. When these vats or tanks are supplied with milk at the pasteurization temperature, and used only to maintain temperature during the holding period, it is impossible to determine from the chart the proportion of time utilized during holding from the portion of time utilized in filling alone, or the portion of time utilized in emptying through an outlet below the bulb of the recording instrument.

No record whatever is made of the milk that may be flowing in, or flowing out, or of the milk that may be flowing both in and out, of the alleged holding vat or tank from leaking valves or other causes during the supposed holding period.

In order that a complete record of pasteurization of milk might be made and that the record of the time required to fill and to empty the vat may definitely be set off from the actual time of holding of all the milk a number of experiments have been conducted with a standard recording instrument equipped with a special device invented jointly by Mr. Samuel M. Heulings and the author.

These experiments indicate that such an instrument can be made by any or all of the manufacturers of the instruments now used by the dairy industry without departing from the standard construction in any essential detail.

The interests of public health will not tolerate doubtful practices. The burden of proof that all of the milk received the pasteurization treatment rests upon the milk dealer. Unless convincing, undeniable and overwhelming evidence (supported by a record showing that pas-
teurization has been effected) is produced, health authorities are justified and it is their sworn duty to exclude the milk from sale. The safety of the public health demands that health authorities be furnished with a complete record of milk treatment, including temperature and actual time of holding to which all the milk has been subjected. This is essential if we are to know whether or not pasteurization has been effected. The use of apparatus not adapted for the connection of instruments to make such records should not be permitted by the health authorities.

PRESIDENT FERNEYHOUGH: I hope you will appreciate the fact there is not a more important subject that will be brought before us than the subject just presented. I can't help but be interested in it as State Veterinarian of Virginia, for this reason: a great many dairymen and people are getting in their heads, from talking with health authorities, and not understanding the said authorities, that you can do away with the tuberculin test and a whole lot of other unnecessary things and substitute pasteurization. You can plainly see exactly what we have to contend with, and I hope you will all remember that paper and will not hesitate to discuss it later on. It is very important. You know the word "pasteurization" may cover up a multitude of faults. It sounds right good when you say everything is pasteurized.

The other day I saw a gentleman advertising a set of pups for sale. There were ten beautiful speckled pups. He said the foster mother brought $1,000 at auction. The foster mother was a Holstein cow. (Laughter)

Our next speaker will be Dr. H. N. Bundesen, Commissioner of the Department of Health, Chicago, Illinois. His subject will be "Milk as Related to Public Health." You all know the importance of that. (Applause)

DR. H. N. BUNDESEN: During the recent World War in France, when our boys went over there and took part in the first engagement, it was quite an important event. Needless to say there was a good deal of excitement when the first battle was on, and the cannons were roaring right and left, and the fellows were dropping.

One officer turned around to a young fellow and said, "You run back of the lines and tell everybody that the battle is on, and if they have any red blood in their veins they will come forward and fight. Tell every one. Get everybody lined up so they can all come and fight."

This young private started back of the lines and he ran and ran. Every place he would see a fellow he would say, "Come on, get up to the front. The battle is on and we need everybody. This is going to be a record-breaker." He ran back and with the stress of excitement he didn't know how far he was running or how the time was passing. Finally, way off in the distance he spied a fellow. He went up to him and said, "Lieutenant, the battle is on and the orders are that everybody should go to the front."

The fellow turned around and said, "Say, don't you call me Lieutenant. I am a General."

The private said, "My God, am I that far back?" (Laughter.)
We have a lot of Generals here. Let's be privates and come up to the front.

I might say, in the city of Chicago, we don't allow smoking on the street cars. It doesn't mean we don't want you to be at home, and I hope everybody will smoke to their heart's content.

(Dr. Bundesen read his paper, "Milk as Related to Public Health.")

MILK AS RELATED TO PUBLIC HEALTH.

By Dr. Herman N. Bundesen, Commissioner of Health, Chicago, Illinois.

Mr. Chairman and Members—

The reasons why a wholesome and safe milk supply is so vital to the health and well-being of a community are, no doubt, well understood by all present, so that a rehearsal of them will not be deemed necessary.

I wish to state in all earnestness, however, that from experience gained as Commissioner of Health of the city of Chicago, I do not believe there is any phase of public health activity which bears a closer relationship to the health and welfare of a community than that of the supervision and safe-guarding of its milk supply.

I understand most of you are engaged in milk control work in other cities throughout the United States, and, no doubt, are interested in knowing what has been accomplished in this city, so I will review some of the measures which have been and are now employed in our methods of control.

In the year 1908, our first pasteurization ordinance was passed. Briefly, this ordinance provided for the pasteurization of milk except that which was obtained from cows declared free from tuberculosis as a result of the tuberculin test.

The tests were applied by private local veterinarians, approved by the Department of Health.

The enforcement of the ordinance was quite satisfactory although the condemnations of reactors to the test were not overestimated. This method of control continued until the year 1911, when the Illinois State Legislature enacted legislation prohibiting any city or town from requiring the tuberculin test of dairy herds.

In 1912, the ordinance was amended, which provided for two classes of milk, namely, pasteurized and inspected; the inspected coming from herds which showed no evidence of disease upon physical examination.

The condemnations of diseased cattle were very few, and the percentage of raw market milk consumed was about 35%. This continued until in July, 1916, at which time the city of Chicago was threatened with an epidemic of poliomyelitis, when a regulation was issued by the Department of Health requiring that all milk except that which was certified be pasteurized at a temperature of not less than 145 degrees F., maintained for a period of not less than 30 minutes.

This regulation is still in effect so that all milk dispensed in this city since July, 1916, except that which is certified, amounting to ap-
proximately 1% of our total supply, has been pasteurized for the past eight years.

Now let us analyze our results; First—it is indeed gratifying to report that Chicago has not suffered a milk-borne epidemic in the past 8 years. I want to supplement this by further stating that not a single case of milk-borne contagion has been traced to our milk supply during this period.

Your attention is further directed to statistical data for the past ten years covering mortality rates of those diseases which in years past we have found to be influenced by the quality of our milk supply, also for the eleven-month period of year, 1924.

Death rates per 100,000 population

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Year 1914</th>
<th>Year 1923</th>
<th>Year 1924</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhoid</td>
<td>6.9</td>
<td>1.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Infant mortality, under 1 year</td>
<td>28.5</td>
<td>16.9</td>
<td>15.3</td>
</tr>
<tr>
<td>Tuberculosis, all forms</td>
<td>162.1</td>
<td>80.8</td>
<td>83.3</td>
</tr>
<tr>
<td>Tuberculosis, other than pulmonary</td>
<td>15.4</td>
<td>11.8</td>
<td>12.7</td>
</tr>
<tr>
<td>Deaths, all causes, per 1,000 population</td>
<td>13.93</td>
<td>11.70</td>
<td>11.1</td>
</tr>
</tbody>
</table>

In connection with these results, mention must be made of the intensive work which has been accomplished in safeguarding our water supply, to which due credit must be given.

That the safety of our milk supply has greatly contributed to this record of progress is without question.

What I have said or will say must not be interpreted as meaning that we have reached such a stage of perfection that there remains no room for improvement. It simply means that we have made a good start in bringing about conditions and the consequent results which are still in a large measure not as yet practically perfect.

As Commissioner of Health of this city, I am especially concerned regarding the safety of milk. While it is most desirable that milk be produced and handled in a cleanly manner which in itself lends much towards safety, nevertheless, I do not believe that too much dependence should be placed upon low bacteria counts. After all our big job is in obtaining milk free from pathogenic organisms and the presence upon the dairy of a human carrier or diseased animal would nullify all our efforts incurred in producing a product designed to be of high quality and safe.

The health of the dairy cattle is of especial importance in the production of certified milk which is usually regarded as specialized milk for infant and invalid feeding. I had the privilege not long ago, of appearing before the Association of Medical Milk Commission, which held a convention in this city.

At that time I advocated what, in my mind, would be additional safeguards in protecting the certified milk supply.

Reiterating my statements at that time, I believe all tuberculin testing of certified dairy heads should be done under federal and state supervision on the accredited herd plan.
In connection with laboratory analyses of milk, especially that which is dispensed in the raw state, I deem it all important that such analyses include besides the bacteria count and chemical test, examination for hemolytic streptococci. This would serve in the case of certified milk as a double check against streptococcus infections of either human or bovine origin.

Of the human carriers of disease those harboring typhoid bacilli are without exception the most dangerous. As an added precaution, I am firm in the belief that in the case of certified milk, "and perhaps—those handling pasteurized milk subsequently to pasteurization" all attendants should, by laboratory tests, be examined for typhoid bacilli at least twice yearly.

A word in connection with milk served in public eating places. A survey made in the Department last fall, showed that of 969 samples of milk taken, approximately 33% were below grade in butter fat.

I issued an executive order requiring that all milk served in public eating places, be dispensed either in sealed bottles or from urns which would insure equal distribution of butter fat and also which could be conveniently taken apart, cleaned and sterilized. This regulation has been in effect less than one year, and a recent survey of 863 samples showed 4 or .46% below grade.

As Commissioner of Health of this city, I am interested not alone in the production and distribution of safe and wholesome milk, but I am equally interested in the increased consumption of this most valued food product. In Chicago the per capita consumption of milk per day is a little less than one pint. While this compares favorably with the amounts consumed in other cities, it is my purpose through campaigns of education to increase this amount of milk consumed per person to one quart per day. For the growing child as well as the adult who wishes to maintain a proper health equilibrium, it is, in my opinion, necessary to consume at least one quart of milk per day, which, I am convinced will greatly lengthen the average span of life and will make for a happier and healthier city.

Since occupying my present office, I have conducted many milk campaigns, the last being the issuance of 500,000 copies of a booklet on milk, a copy of which was delivered to every dwelling in Chicago. I am leaving several copies of this special bulletin with you.

I trust that you will accept my views in good grace and in the spirit of co-operation, as after all, every one of us is striving toward the perfection of that most valuable food product, without which we could not long endure.

PRESIDENT FERNYHOUGH: Gentlemen, I know you have all enjoyed that interesting address. It reminds me very much of a very good, old Christian lady who was sent some peaches and a jar of brandy. She wrote she not only enjoyed the contents but she appreciated so much the spirit in which it was sent. We not only enjoyed the contents, but we appreciate so much the spirit in which it was delivered.

Our program seems to have been changed somewhat from the regular program. The next is "Relation of Milking Utensils to the quality
of Milk," by Dr. M. J. Prucha, Department of Dairy Husbandry, University of Illinois, Urbana, Ill. (Applause)

DR. M. J. PRUCHA: Mr. Chairman and Gentlemen: I enjoyed, as you did, the address we have had on this most interesting subject of "Milk as related to Public Health" and the work of the sanitarians who try to control the milk supply, and you will have to bear with me and turn to a subject which is rather dry. That is, "The Relation of Milking Utensils to Sanitary Quality of Milk."

There are only two avenues really through which milk becomes contaminated—anything that passes through the air in the milk and anything that is on the utensils with which the milk comes in contact. That being the case, then utensils become somewhat an important relation to the condition of the milk.

The early developments of bacteriology, as you probably all know, took the channel of pathological work from about 1860 or so to 1890. The bacteriological literature is particularly abundant on work of disease. The term "micro-germ" or "bacteria" consequently became defined in public minds as disease producers, and to this date that impression has stayed in public minds. Whenever you speak of a germ, people shudder.

After bacteriological methods were perfected and everybody began to examine bacteria, hunting for germs, all of a sudden bacteriology discovered that milk had many bacteria no matter where it got it. One bacteriologist explained why we had more bacteria in milk than in sewers. With that setting, dairy bacteriology was ushered in, say, somewhere about 1890.

As far as I know, the first piece of work of any consequence in this country was somewhere about 1887. It is most natural then that we would do the same thing, and people would do it immediately if attempts were made to control the milk and, if possible, make it safe. Since the term "germ" was somewhat synonymous in the minds of the public and to some extent the tendency had been also to put a definition on the sanitarian as being a bacteriologist, ordinances for milk supply immediately sprung up in communities. One of the schemes to make milk safe was then to limit the number of bacteria in milk. So today we have in most of the large communities and cities, milk ordinances limiting the number of bacteria.

It is not my duty here, and I am glad of it, to discuss this subject—the significance of germs in milk—but we have this ordinance, and I don't mean to imply I don't believe in it. We have these ordinances limiting the number of germs in milk.

When this situation was presented to producers of milk they immediately began to raise this question: "I am to produce milk with just so many germs, and no more. How can I do it?" You would be surprised at the number of inquiries from milk producers which have been flooding offices of the experiment station, and others inquiring "How shall we do it to comply with this requirement? How shall we do it?"

As a result of this avalanche of inquiries, a large amount of work on this subject has been undertaken. So from about 1890 up to the pres-
ent, almost, when you examine the bacteriology literature in this country and other countries, you will find it is very abundant on this one point: "Where do the germs come from in milk?" The literature is very abundant, and in a manner it has been very fragmentary, and the result was it confused rather than clarified the purpose.

After all, the amount of work that has been done is very large, and we have been able to equate somewhat accurately and are able now to answer these questions, "Where do the germs come from that are present in the milk?" and "How can we control it?"

Up to about 1910, I would say, a large share of the work on this subject was devoted to the study of barns, to the study of the influences of dust and dirt and everything, and its relation to the number of germs in milk. I was in a conference when several of the bacteriologists were present. That was about twelve years ago. We were discussing the question, "Where do the germs come from?" We took the records from this city, from these laboratories. If there were 2,000,000 germs in apparently fresh milk then we would say these investigators found you can get so many germs from the dust, so many from the hay, so many here, etc. We tried to equate the things when we got the sum total of the possible contamination up to that time as we studied it and then looked at the total number of germs in milk. Yet we could not square. We found there was a leakage somewhere, and that germs got in the milk in very large numbers, for which we could not account from the experiments.

Finally, one of the men said, "We have tried everything, but as far as I know there has not been very much done on the question of utensils as related to milk." From this conference we immediately began to form bands for the work, and work was started soon after. It was my fortune to be connected with some of these experiments and some of this work, and I will try to give you the results of it.

I might say we started this work on the utensils at the University of Illinois just about ten years ago. There were a few scattered instances or records on the subject of influence of utensils on record. For example, Professor Russell, Dean of the Agricultural College of Wisconsin, way back in 1890 came out with a statement, "Look out for milk utensils. They are a prolific source of germs." Professor Brigar, of the University of Pennsylvania, also in 1904 or 1905 came out with a paper stating utensils may be important and are very important, and Professor Cann, way back some twenty-five years ago stated he thought the utensils were the most prolific source, or may be, in milk. But their warnings way back there did not take root. Very little attention had been paid.

The milk industry has been washing and cleaning utensils in the same old way and doing the same old thing. About ten years ago we started this work and we have devoted probably four, five or six years of continuous work and spending something like $30,000 on this one problem. We set out to do three things. First, "What is the bacteriological condition of the utensils as they are used under commercial conditions?" Second, "What are the causes? Why are there so many germs under
certain conditions in the utensils?" Third: "What can we do to control it, and apply it to their business so we can have utensils free from this contamination?"

With your permission I will refer to a few results on the bacteriological condition of the utensils as we found them. We went to a farmer and examined the utensils as they were ready to receive milk. These, particularly the shipping cans, were returned from the dairies, from the milk plants to the farm and were ready to receive milk. The utensils were washed and were supposed to be steamed. The average number of bacteria in about fifty cans examined, which were washed, steamed and ready to receive milk, would have added, if the cans had been filled at the time, at least 24,000 germs per cubic centimeter. The process of steaming utensils is about the same caliber here and there, and in many places worse. We examined again the utensils that had been washed without being steamed. We found a lot of thirty cans in one place that would have added 88,000 bacteria per cubic centimeter. That is, taking sterile milk and filling it and stirring it and taking a sample, the increase would have been 88,000 per cubic centimeter.

We found another lot, of about 56 cans, that would have added 87,000; another lot of 30 cans that would have added 48,000, and another lot, 56 cans, in a dairy where we knew they were rather careless in washing, and those cans would have added approximately 300,000 germs per cubic centimeter on the average.

We kept these results for over two years. I said I wouldn't publish them because I am not quite sure about it until somebody asks me to check. But subsequent work by two or three other men in the country doing the same work, found the same thing. It was almost unbelievable the number of germs you can get in utensils.

The next thing we proceeded to do was examine other utensils than cans. We went in a dairy, and, for example, we had the cans washed and sent to the dairy; had them filled with milk and then took samples.

Then again we would, for a number of days, run a test by having the utensils absolutely sterilized, not by steaming in the dairy but we would sterilize them in order to be sure they were absolutely free from germs. We found this: We were working three different dairies. The milk came in the cans within an hour after milking. The utensils and pails were sterilized, and we were able to get milk every day with an average of about 5,000 per c. c. from three different barns.

When sterilization was stopped and we just let them wash the utensils without steaming, the milk from one dairy averaged for about a ten days' run, 300,000; another dairy, 327,000 and another dairy 220,000 per c. c. In other words, the influence of these utensils completely overshadowed all other contamination in those barns as to the number of germs.

In another place we followed the bottling process, where the milk producers bottled the milk right on the premises. We sterilized every utensil from the bottle to the pail and strainer, and everything. For ten days, the night's milk that was delivered the following morning, was less than 5,000 per c. c. when we stopped sterilizing, the milk would jump. It
ran anywhere from the lowest count which was about 50,000 to a bottle, to the highest count which was over one-half million. In other words, the total contamination in the barns we were working was less than 5,000 when the utensils were completely eliminated, but when the utensils were handled without proper steaming and sterilizing it ran anywhere up to one-half million.

We found the more complex utensils were, naturally the more important they were. For example, the clarifier alone, when it was not steamed, added thirty times as many germs as those added in the barn; with the bottle filled we found something like fifty-six times, and so on. I could repeat but I won't burden you with anything, but it will give you some impression of some of the results which we have obtained. I think these results have been corroborated here and there. That is, the utensils are and have been, handled under commercial dairy conditions, probably the most important source of bacteria in milk. That is not in all places, but generally speaking.

The next question we then tried to answer was, "What are the factors responsible for these high counts in milk due to utensils? Why do they add so many germs?" We found it was first due to lack of proper cleanliness. We started the work about ten years ago and probably finished about four or five years ago. Since then, every once in awhile we examine things, and many of the large dairy plants have introduced machinery for cleaning utensils. Many of these machines for cleaning and bottling seem to be quite effective, so the chances are we are gradually eliminating this tremendous source of contamination here and there. You must remember that, probably after all, a large percentage of the milk is handled not in large milk plants like Bowman's and those in New York City, but rather small, improperly equipped dairies. The importance of utensils to this day is a strong and important question.

Lack of proper cleaning, we found to be a very important factor. Since I became interested in the subject, whenever I go to a milk plant I usually go right straight to the place where they do the cleaning rather than to the manager's office. Many, many times, I have watched the men to see how fast they do it and how they do it.

When I was in one milk plant I was standing with the manager. We were examining some samples of dairy products, and the man was washing the bottles. My eyes were on the man. He washed thirty cans while I was looking, using a hand brush. Of those thirty cans only five saw the brush on the inside. When we spoke to him the brush began to scrub the inside of the can. That may be an extreme case, but this thing is going on today. The proper cleaning is neglected, and usually the manager is too busy to look after it. The men who do the work are poorly paid as compared to the manager's salary and they are irresponsible. Sometimes I wonder if a dairy wouldn't produce a higher grade of milk if the salary for the manager and the man doing the washing was reversed for a while, so that the position of cleaning draws an able man to do it. But we found that an important factor in explaining the situation.
I observed another thing in one dairy. They had about thirty gallons of water in a tank with probably washing powder in it, and they washed something like 200 or 300 cans. By the time 200 of the cans were washed, I believe you could almost stand on the top of the water without sinking. The can and utensils are placed in the barn. They are put in vehicles. Mud and manure may get on the outside of the utensils, and when you consider the cans are put in water, naturally it swells the total amount of contamination. Both bacteria and dirt are readily imagined. So one of the reasons we found was the lack of changing the water frequently.

Lack of thorough rinsing after washing. One dairy, for example, did not rinse sufficiently with clean water, thinking a little shot of steam in the utensils would be sufficient to rinse them. As a result of that, when the utensil stands for a while there is enough to feed the billions and billions of population of bacteria in there.

In treating utensils there are two things to obtain. In the first place, you should remove the visible dirt and the remnants of the material that was in the utensils; second, get the utensils bacteriologically clean. Those two things do not run parallel and each needs different treatment. The latter point has been frightfully neglected. The lack of steaming has been a very important source of bacteria in cans, for the reason it is not steamed enough.

Another reason and probably the most important reason is this fact: milk cans are washed in the milk plant without being dried. They are washed and supposedly steamed without being dried. They are then covered with a lid and sent out. You cannot imagine the condition of these utensils twenty-four hours later, especially in the warm weather. In other words, the lack of drying has been probably the most important source in spite of all cleaning, lack of drying of utensils that are not used until some hour after they are cleaned is a very important factor.

Many of the milk plants are now attempting to dry by machinery. The drying is not entirely satisfactory for various reasons, but the improvements are coming.

The common name for shipping cans by men who subsequently use them is "stinker can." It is rather an unaesthetic term, but when they take the lid off the can sometimes smells very, very badly. You would be surprised to see how many cans of that type receive milk today.

To check on this point to show how important it was, we prepared an experiment by taking milk cans and sterilizing them completely, bacteriologically. Then we rinsed them with some of the rinse water we found in a vat where they were rinsing milk bottles. We rinsed them and threw out all the water which had bacteria in, and we covered some of the cans, and left some of them open. We kept them in room temperature for about twenty-four hours. Those left open, at the end of twenty-four hours contributed less than 1,000 germs per c. c. to the milk, when filled. Those left covered contributed about one-half million germs per c.c., when filled. There is a tremendous growth of germ life when they are not kept right. That is the big factor in this matter.

In regard to the kind of germs in utensils, I already mentioned that the wash water may contain anything under the sun in the matter of
germ life. It contains probably every kind of germ that was in the milk, because a certain amount of the milk is washed in the wash water. The washing powders are not disinfectants, and therefore you get a miscellaneous bacteria population in the wash water. Of course, when you take the can out of the wash water these various things will adhere to the inside of the can. If the can is not properly treated they will get in the milk. For example, in a can that was thoroughly steamed, if it was covered and left for about thirty hours, the germs would become numerous and there would be various types. For example, there was one pure culture of bacillus sessilis and when the milk was in the can the milk became contaminated. I saw literature stating that bacillus sessilis in milk is rather objectionable.

That brings me to another point. You may properly wash the utensils, and you may steam them as done under commercial conditions, and you would not have a sterile utensil. It is impossible. But you may steam them so the utensils may play a negligible part; after the steaming if you cover the can there is a certain amount of moisture there and held there. If you then send the can, especially in the summer, to the farm and it may not be used until twenty to forty hours later, the can becomes unfit to receive milk because of the fact that the few germs which survived the steaming began to grow and have seeded the can very heavily which emphasizes the importance of moisture in the utensils which are not used immediately after steaming.

The next step was to devise schemes for standardizing the handling of utensils, so we are able to recommend specific recommendations as to what to do with utensils to make them fit to receive milk. Rinsing with cold water removes anywhere from fifty to seventy per cent of the bacteria population in the utensils. That is just the mechanical removing.

I recall one dairyman who was sending milk to a large milk plant. This particular dairyman had only about five or six cows, yet there was another—dairy—a rather famous dairy—with latest conveniences in every respect. This simple dairyman was able to beat the other one when it came to bacterial counts in the milk when it was delivered. We visited his dairy to see just how he did it. He was ready for milking. He took the pail and cans and filled them with well water. He had a good supply of well water. Then he poured the water in the two cans and through the strainer, rinsed them thoroughly and threw the water out. I said, "What do you do that for, Mister?"

He said, "I cool these utensils and the milk cools quickly when I put it in and it keeps better." At the time I saw this instance I didn't think much about it, but after we were working with the subject he came to my mind, and my explanation is that by mechanically removing and thoroughly rinsing with cold water he removed a large proportion of the germs in those utensils, and made the utensils fairly acceptable to receive milk. So this mere rinsing with proper clean water does wonders.

It takes about two quarts of boiling water to rinse a can to make it fit to receive milk, so the can does not add more than ten germs per c. c. to the milk. My experience on this subject of using hot water for
rinsing is that the water is very seldom hot enough as it is done on the farm.

The next is the question of disinfectants. I am not ready to say anything on that subject.

The question of use of steam. After examining some thousand cans and steaming them in various ways in order to supply the information, "How shall we steam the cans to get good cans?" we found from our results that it is necessary to blow twelve cubic feet of air pressure when you steam cans over a jet, in order to put the can in such condition so it does not add only about ten germs per c.c. when it is used after steaming.

Translating the same results in other terms, a can in the milk plant should be steamed between fifteen to thirty seconds with the equipment in the average milk plant to get a satisfactory can. Where the machinery does not control the steaming, I found cans are steamed from two to ten seconds. It depends upon the other operations. I have heard the manager state, "Hurry up with the cans. There is another load waiting for you. Cut that short. It is a waste of energy. It is a waste of time to blow more than one, two or three seconds of steam in the can, because there is a danger or tendency to make the can an incubator. You warm it up and cover it, and then the germs have a good time."

The other point is the question of drying. It is absolutely necessary if the utensils are washed properly and steamed properly and are not used for some ten, twelve or twenty-four hours, not until then, that the utensils be dry. If they are not dry it is necessary to treat them again before they are used to make them fit for milk.

So our conclusions from this whole work were that utensils in a dairy business have been an extremely important source of bacteria. When we finally get in a position where every dairy is able to treat the utensils properly the bacteria population of the milk will be reduced, my guess will be, more than fifty per cent. I thank you.

PRESIDENT FERNEYHOUGH: Gentlemen, we here from Dr. Jacobs, Chairman of the Committee on Tuberculosis. It is as follows:

"U. S. Live Stock Sanitary Ass'n,
Hotel La Salle.
"Regret very much sudden developments which prevent my addressing meeting in Chicago on December 4th.
"(Signed) NATHAN STRAUS, JR.,
New York."

So we will not have him with us, sorry to say.

As stated before, the papers will be discussed when this morning's program is over. While there is some difference there is a strong similarity.

I walked into a hospital in Richmond the other day, and while talking to a lady, she said, "Doctor, did you ever think of the similarity between a baby and a widower?"

I said, "No."
She said, "They are very similar."
I said, "How is that?"
“Well,” she said, “the first six weeks they do a lot of crying and then after about six months they sit up and take notice, and it is mighty hard to carry them through the second summer.” (Laughter.)

“Is Raw Milk Safe? How to keep it so,” by Dr. O. C. Bowes, Inspector Pittsburgh Certified Milk Commission, Pittsburgh, Penn.

Thursday Morning, Dec. 4, 1924.

In a discussion of the subject allotted to me, one’s thoughts turn to various phases of raw milk, such as the food value, the effect on nutrition of the individual consuming the milk, the factors influencing its composition, its flavor, its bacterial content, both qualitative and quantitative, the significance of bacterial content, the cow and her environment both in pasture and in stable, the technique of the milkers, the technique of the bottling room, the care of the milk in transit and in the home of the consumer. It seems to me the function of the veterinarian in the dairy business should be not only as a veterinarian but a sanitarian as well.

Food Value: The food value of milk is too well known to all of us to warrant a discussion here.

Effect on Nutrition and Growth: Much has been written concerning vitamins, and mineral nutrients and their effect on growth and nutrition. We, as veterinarians, should remember: That the cow is the best known concentrator of vitamins taking these chemical substances which are present in such small quantities in her food and secreting them in much greater concentration in the milk; that the quantity and perhaps the quality of these vitamins are influenced by the kind of food the cow eats, fresh green grass being better than dry fodder; that the antirachitic value of milk is best when the cow is on pasture. The same cows, when fed in dark stalls, yielding milk much inferior in antirachitic properties; that raw milk has more available Ca. and P. for growing children than the same milk when pasteurized; that heat and age are the two things most destructive of vitamins in milk as well as other foodstuffs. From this very brief and general outline we see that, from the vitamin and mineral nutrient properties, raw milk stands alone as the safest food in the world for human consumption.

Factors Influencing Flavor and Composition are sometimes obscure and hard to determine. For example, about one year ago a distinctly salty flavor, with an astringent taste accompanying it, developed at one dairy. Tasting of milk from each cow showed the taste present in about nine cows. These were removed and the next day the taste appeared in seven more cows. Nothing in the feed could be compared to this taste in the milk. Finally it was determined that they were washing the cows from the shoulders back with a rather high concentration of sodium hypochlorite and apparently it was being absorbed through the skin and later secreted in the milk. Samples of milk, to which a drop of the disinfectant was added, could not be detected from some of the off flavor samples from the cow. The trouble has not appeared since that time.

At another time an unusual burnt flavor appeared at another dairy. Examination of the feed mixture did not reveal anything but examina-
tion of the separate feeds making up the mixture showed in one of the ingredients, a by-product from a new industry, a flavor resembling that found in the milk.

Discontinuance of this feed eliminated the trouble. There are many more common off flavors, such as wild onion, smart weed, etc., etc., any one of which will ruin your trade if found in the milk.

Regarding the Chemical Composition of milk, Mai says that "milk is not a definite chemical substance nor fat, its most valuable constituent, except to the butter maker, therefore fat standards are undesirable. A sample should be condemned because adulterated and not because it fails to conform to some arbitrary standard." In other words milk should be sold as it comes from the cow, nothing added and nothing taken away. While this may seem reactionary or revolutionary it seems to be his mature judgment of the matter. In our method of handling certified milk, where it is bottled immediately after milking, no complaints from consumers have reached me concerning a variable fat content. I believe all of us would prefer milk produced in such manner that no visible dirt should get into it; that the udders of the cows, the hands of the milker, the milk pails, the cooler, the bottler and the bottles should be clean enough that the average bacterial content of the milk should be not more than 10 to 15 thousand, and this milk delivered to us in the original container, kept properly refrigerated, rather than to purchase milk which has been produced in such manner that it contains visible dirt and an average bacterial content of 3 to 5 million when it reaches the gathering station in the country, has to be run through a clarifier, through vats over coolers, possibly pasteurized, then into shipping containers, shipped long distances, then into vats, where the fat content is standardized perhaps by adding cream or skim milk, acidity corrected by adding alkali, pasteurized, cooled and bottle by men, and conditions that by no stretch of the imagination could approach the sanitary conditions possible on the farm. We must remember that every time you transfer milk from one container to another you are going to contaminate it. Kohler and Tonney found that in their study of pasteurization samples from five types of pasteurizers in seventy different establishments that the work was generally effective, but there was a constant and uniform element of recontamination.

But you will say that pasteurization will purify a milk however badly it may be contaminated. Schollberg and Wallis, in investigating the chemical changes produced in milk by bacteria and their relation to epidemic diarrhea in children, found that the pancreas of infants show that both peptones and peptone-like substances have a toxic effect. The bacteriological results obtained indicate a connection between the production of these substances and the quantitative and qualitative bacterial content. Thus we see that a milk with a bacterial content of 3 to 10 million has proportionately greater amounts of toxic substances than milk produced with bacterial contents of 10 to 15 thousand. The instances to support this contention in practical infant feeding are legion.

Still you will say the cost of supplying milk to large cities would be prohibitive under such conditions; that it would be impossible to get
enough milk. Let us see what the conditions are: The amount of milk consumed in the homes of city people probably averages about 1 quart to each five persons. Take the metropolis, called Greater New York, with a population of 10 million people. This would require 2 million quarts of milk per day. Assuming that a cow gives 10 quarts of milk per day, it would require 200,000 cows to supply this area. We see that 250 dairies of 700 cows each could easily furnish this amount of milk. With improved highways and the farms strategically located, this milk could be delivered to the consumer with no more cost than the average city delivery today, and the expensive transportation charges and high rents of the city plants, together with the enormous overhead, could be eliminated and the customer would get his milk not more than 24 hours old. I have purposely selected as the example the most difficult city in the East to supply. For smaller cities, located more inland, the problem becomes proportionately more easy.

How then has pasteurization come into such common practice in this country? First and foremost it delays the process of souring. It enables milk to be sold, that without pasteurization, would be impossible. My contention is that it is practicable to produce milk that does not need pasteurization. About two years ago I overheard a conversation between a milk driver and a housewife. The weather was unreasonably warm for winter and the lady was complaining about her milk turning sour. The driver replied “that they always called up the weather man in the afternoon to find out what the weather was going to be the next day, and if it was going to be cold they did not pasteurize; just let the milk run through the pipes.” The weather man in this case was safeguarding the health of the people. The National Dairy Council has recently published a circular on Pasteurization, in which they quote from the replies to a questionnaire sent to various chemists, medical men, etc. At least four of these individuals are personally known to me and they would not hesitate to admit that they know more about laboratory work than they do about practical dairying or sanitation. In talking recently with one of them I asked him if he thought a certain dairy farm should have their milk pasteurized, and he said, “No, that barn and dairy is cleaner than any pasteurizing plant I know. But he says those farms that haul milk to town in cans with no steam to sterilize their utensils, I think should be pasteurized.” When they speak of proper pasteurization I think it is well to remember that there is a difference between experimental pasteurization and the ordinary “day in and day out” operation of commercial pasteurizing plants.

I recall another recent conversation with a man who operates a local slaughtering establishment. He asked me “What a certain ice cream maker did with so much lard?” Said they were his best customers.

Let’s Have Sincerity in the Dairy Business. A man who knowingly adulterates a dairy product should be forever barred from the dairy industry in his state, and his name and perhaps his photograph sent to the authorities in every state in the Union. Conscientiousness of supervision, together with properly trained employees and equipment necessary for sanitary procedures, are far safer than a lot of high-priced machinery located in a city plant with the milk being produced hundreds
of miles away, where the authorities at best cannot supervise its production properly and the consumer has little chance to see what he is getting.

The following table, giving results of feeding infants with milk from a farm on Staten Island, N. Y., is typical of many of the comparisons made of raw vs. pasteurized milk:

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<tr>
<td>Pasteurized milk, 1,000 to 50,000 bact.</td>
<td>41</td>
<td>31</td>
<td>10</td>
<td>3</td>
<td>4 oz.</td>
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<td>Raw milk, 1,200,000 to 20,000,000 bact.</td>
<td>51</td>
<td>17</td>
<td>33</td>
<td>5.5</td>
<td>3.5 oz.</td>
<td>11.9</td>
<td>2</td>
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</table>

Milk with a bacterial count far below that given for the raw milk would today be excluded by discriminating people as unfit for food, not to mention feeding it to delicate babies.

You cannot clean dirty milk. Nearly 85 per cent of fresh cow manure will dissolve in milk, 83 per cent being moisture. No machine or chemical process will remove this material in solution. Dr. Harding, in 1916, in discussing Bact. count as an index of cleanliness in milk, says "That a gram of cow manure, containing 5,000,000 bacteria, could be added to a liter of milk and would increase the germ content only 5,000 per c.c. Hence otherwise very low germ content milk might carry approximately 2 grms. of cow manure per qt. and still not exceed the ordinary limit of 10,000 bact. per c.c. for certified milk. Likewise a qt. of Grade A milk might contain 12 grms. cow manure and still be legal Grade A milk." Such statements are biased, ridiculous and, more's the pity, not worthy of a man of his training. For your information I should like to have each of you read the rules for the production of certified milk and see for yourselves if total bacterial count is the only index of cleanliness. I do not agree with his statement that cow dung is the most common source of filth in milk. I have proven to my own satisfaction and that of many others, many times, that the most common source of high bacterial counts in milk comes from unclean utensils. I may further state that it is not practicable to sterilize unclean utensils.

I wish now to bring to your attention a few thoughts on udder inflammation in cows. It is commonly believed that mastitis, whether human or bovine, is caused by the invasion of strep into the udder tissues. In 1921, S. Jollema, in analyzing abnormal milks having chemical composition resembling milk from streptococcic udders, failed to find strep in several samples. This led them to think strep. might not be as important as is generally believed in udder infections. To examine this point an aseptic udder inflammation was produced by injecting .2 per cent Ag, No. 3 into one quarter of the udder under sterile conditions. (Healthy cow in full lactation.) The milk from this quarter that was injected was abnormal in 14 hours, while milk from the other quarters was nor-
mal, and it continued abnormal for eleven days, when no more milk could be obtained from it, even though it was milked at the same hours as the other quarters. They could never find strep. in the milk of the treated quarter. All the constituents of this milk resembled those from quarters with strep. infections, e.g., in chlorides, lactose, total proteins, CO₂, Ca, Tryptophane, acidity, leucocytes and sediment. The low acidity of this milk was to be expected, as the composition of milk from inflamed udders approaches blood plasma. Our experiment proves that other affections than strep. can produce the same changes in milk. Therefore aseptic and bacterial inflammations have in general the same influence on the chemical composition of milk. Our results make it more probable that strep. infections of the udder are usually originated by non-bacterial lesions, namely, that the strep. invasion is secondary. The samples of milk taken from this cow before injection were normal.

We also wished to know whether the streptococci were retained by the udder tissues in those cases in which milk of abnormal chemical composition contained no strep. For this purpose we analyzed the milk of animals brought to the abattoir to be slaughtered, owing to serious udder diseases. Also parts of the udder tissues were examined microscopically to find out whether strep. were present and to determine the nature of the mastitis. Here samples of milk of a very abnormal composition were at the same time devoid of streptococci. In these cows the abnormality of the milk could not be attributed to irregular milking because milk differed in different quarters of the same cows.

Some of you may say that the absence of strep. in the cases mentioned was due to their destruction by the antibodies of the blood, but it is hardly likely this will account for all of the cases. Many of you who are familiar with certified dairies, where thick milk is detected early, can recall instances of cows that recovered in a day or two when the feed was taken away, and a purge given. I recall several years ago removing, on my first visit, about 40 cows from a herd where milking machines were used, these cows all showing udder inflammation, and the bacteriologist insisted there was no strep. in the milk of any of them.

In closing I shall say that clean raw milk is just as safe and healthful as a food as it ever was, that its continued use will stimulate the dairy industry, where pasteurizing will curtail consumption, that to keep it safe we must insist on conscientiousness among everyone connected with it, together with proper training. It will work no hardship on the producer to have the health of his employees and his cattle examined and have essential sanitary equipment. This he should do whether he produces certified milk or Grade A, or whatever he may call it. My judgment is that the price at which certified milk is sold is the principal reason why the public does not demand it exclusively.

PRESIDENT FERNEYHOUGH: We will now have the report of the Treasurer. I think you will all be interested in that report.

Dr. Dyson, We would like to have your annual report.

(Secretary Dyson read his report.)
REPORT OF SECRETARY-TREASURER.

Receipts.

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$1,445.00

Honor List of State Memberships.

Virginia                              New Jersey
Montana                                Florida
Minnesota                             Pennsylvania
North Dakota                          Connecticut
Texas                                  New Hampshire
Kentucky                               Colorado
Michigan                              Iowa

Dept. Agriculture, Canada
U. S. Bureau Animal Industry.
PRESIDENT FERNEYHOUGH: Gentlemen, I think it is indeed not only a credit to the organization but to the veterinarian profession for the way in which Dr. Dyson has handled the financial affairs. You all remember the condition just a few years ago when he took charge. It is indeed a credit to us all, as well as a financial benefit, to hear this report this morning. I suppose it is now in order to pass upon the report.

DR. FITCH: I move the adoption of the report.

(The motion was regularly seconded and unanimously carried.)

PRESIDENT FERNEYHOUGH: Now, gentlemen, the papers we have had this morning are open for discussion. The first paper was "Several Uncontrolled Factors Frequently Associated with the Commercial Process of Pasteurizing Milk," by Dr. Grim. That paper was read by Dr. Bruner. I wish to call your attention again to the fact that I do not believe there is anything more important to come before this Association than that. We are continually being confronted with the fact that pasteurizing is all right and covers all ills.

I wish to cast no reflection upon pasteurization, but I do say it in no way takes the place of the tuberculin test and other measures which we should keep our eyes on. I would like to ask you what commercial firm there is in any city if the machine should break down, that will put up a sign "No milk for several hours today because the pasteurizer is wrong." You are not going to hear a word. The milk is going on just the same.

In other words, gentlemen, pasteurization is merely a mechanical device and has no moral obligation. While I do not want to in any way reflect upon it, I do want to protect what we are doing professionally in the application of the tuberculin tests and other measures, and not have them misrepresented by people thinking that pasteurizing covers all things. Therefore, I hope you gentlemen will feel perfectly free to discuss this. It is now open for discussion.

DR. E. A. CROSSMAN: In listening to this paper on pasteurization and others presented to this Association, it seems to me we have overlooked, for a minute, a very important factor. We are thinking only of the health of the population of the cities of these United States. According to our last federal census slightly over fifty per cent of the population of the United States live in rural districts, either on farms or in communities with population of 2,500 or under.

We will all agree that efficient or official commercial pasteurizing in communities of this kind is out of the question. Furthermore, according to this same census sixty per cent of the births of the last year, or the year the census was taken, were in the same communities, so it would seem in all our discussion on pasteurizing we are only protecting a proportion of the population, less than one-half of all in the United States.
PRESIDENT FERNEYHOUGH: Is there any further discussion on that paper? If not, we will pass on to the next paper, which was "Relation of Milking Utensils to the Quality of Milk." Has anyone anything to say on that? You people don't seem to take much interest in this important subject. I guess the paper was so thorough it didn't leave you anything to say.

"Is Raw Milk Safe? How to Keep It So." You have had a good paper on that. That is open for discussion. Any one desiring to discuss this paper will kindly do so now. If you are not disposed to discuss the paper, I believe our morning program is now at an end.

(The meeting adjourned at eleven-fifty-five a.m.)

Adjournment.

THURSDAY AFTERNOON SESSION.
December 4, 1924.

The meeting was called to order at one-thirty o'clock by President Ferneyhough.

PRESIDENT FERNEYHOUGH: We have for our first paper this afternoon, "The Problems of Tuberculosis Control in Cattle Under Range Conditions," by Dr. W. J. Butler, Executive Officer and State Veterinary Surgeon, Live Stock Sanitary Board, Helena, Montana. Dr. Butler couldn't come so Dr. Marsh, his assistant, is going to read Dr. Butler's paper.
THE PROBLEMS OF TUBERCULOSIS CONTROL IN CATTLE UNDER RANGE CONDITIONS.

By Dr. W. J. Butler, State Veterinarian, Montana.

Tuberculosis in strictly range cattle is not a common disease. In fact, according to our investigations and from reports which I have obtained, I am safe in saying that tuberculosis is a rare disease in true range cattle.

Information to the contrary, which has been given out, is based upon the fact that tuberculosis has been found in winter fed, or winter pastured cattle that range during the summer months.

It has been our observation that tuberculosis will spread rapidly when it is introduced into a pasture-fed herd, in fact, probably more so than in a stable-fed dairy herd. The reason for this is obvious. In stable-fed cattle each animal has its individual stall, and unless cattle face each other or there is a common water trough running the length of the stable, the disease has very little chance to spread in an extensive manner before it is discovered.

In pasture cattle, conditions are entirely different. These cattle are generally fed on the ground; the animals trail over the path of each other, graze over the bed ground and pick up the little loose ends of hay and refuse from manure which is always found on the bed ground. In many pastures we have stagnant water holes, and next to actual and steady contact with a spreader, I consider contaminated manure and stagnant water the most important factors in the spread and propagation of tuberculosis.

In a number of instances we found it extremely difficult to eradicate tuberculosis, in pasture herds in foothill and mountainous country where the disease had got a good start. With the use of the intradermic test we had no difficulty in testing all of the cattle in infected districts, but we did find great difficulty in preventing reinfection. This was undoubtedly due to the many water holes, and to the fact that manure contamination was carried over the fields during the spring months by irrigation and snow water. Farming is not carried on in these districts on account of their high altitude, therefore, there is very little, if any, plowing done. They have natural meadows upon which the cattle graze in the fall and where they may be fed during the winter months. To eradicate tuberculosis under such conditions requires several combination retests to insure the removal of all tuberculous animals. To prevent reinfection requires the removal of cattle from possibly contaminated premises and pastures until such contamination has been removed from such premises by cleaning and disinfecting, or by burning. Pastures must be harrowed or dragged with brush to break up manure particles, and left idle during the summer months. In such pastures all stagnant water holes should be drained and kept dry and exposed to sunlight during the same period.

Such a procedure is easier said than done—nevertheless, if success is to be accomplished in the eradication of bovine tuberculosis, attention to details for the prevention of reinfection is just as important as the proper application of the tuberculin test itself.
In passing I may mention that in pasture fed cattle we invariably find the cervical glands infected which is a fairly good indication that infection is carried into the system with food or water. In such cattle we also find quite a few skin lesion cases, but they are generally associated with cervical gland infection. Skin lesions indicate ground or feed contamination just as does primary cervical gland infection.

With strictly range cattle the problem is much more simple. Here the problem resolves itself into one of prevention for the simple reason, as I have said, that tuberculosis does not now exist in such animals to any appreciable extent.

In order to prevent the introduction of tuberculosis and to be assured of purchasing healthy cattle, we should purchase only from accredited herds, or modified accredited areas. In the case of bulls and purebred breeding cows and dairy cattle, an additional protection may be secured by subjecting such animals to a 60-90 day retest, but if purchased direct from accredited herds, and handled in accordance with accredited herd regulations, such a retest should not be necessary.

With reference to Modified Accredited Areas, the present regulations discriminate against the range states. That is somewhat unfair. Not that it was meant to be so, but unfortunately for us, our conditions were not understood and it was considered unwise to make exceptions to the testing of all cattle in a given district.

Bovine tuberculosis eradication has advanced far enough now for the United States Bureau of Animal Industry to have an adequate idea of the prevalence of the disease, and its main centers of infection. Official figures in this work have demonstrated that the problem in range states is to locate centers of infection, and not to locate clean areas, as is the problem in most middle western and eastern states.

We all agree that the work on hand is to eradicate bovine tuberculosis, and not one simply of tuberculin testing cattle. If this is so, why should we be asked to test cattle that are next to impossible to test and in which tuberculosis does not exist? That tuberculosis does not exist to any appreciable extent (probably not more than exists in accredited herds) in range cattle is amply proven by Federal Meat Inspection Post-Mortem reports, and by the tests of bulls and other cattle from range herds, by Federal and State authorities.

In Montana in 1923, Federal and State authorities tested 91,007 cattle with forty-three one-hundredths of one per cent reactors. This year we have tested 90,135 cattle with forty-seven one-hundredths of one per cent reactors. Several years ago, particularly to demonstrate that tuberculosis did not exist in range cattle, we in conjunction with Federal Veterinarians tested over 8,000 semi-range animals without finding one reactor. If this is true of Montana, it is equally true and probably more so of such states as Texas, Arizona, New Mexico, Wyoming, and other southwestern and western range states.

You must remember that some western states have had an active tuberculosis eradication and prevention campaign for the past fourteen years. If it had not been so, we would now have a very difficult problem on our hands. Western states have undergone a considerable settlement during the past ten or fifteen years. With this settlement naturally there
were imported many dogey cattle. As far back as 1914, the Montana Live Stock Sanitary Board office issued an order requiring the 60-90 day retest of imported dogey and breeding cattle. In 1916 we found that 10.3% of such cattle imported that year were tuberculosis, even though they came into the state accompanied by an official tuberculin test chart. With Federal aid coming to our assistance in 1917, bovine tuberculosis prevention work was made doubly easy for western states.

But what has all this work done for our live stock growers? True, it has saved him some loss by preventing tuberculosis from gaining entrance into his herd. But it has not gained him any financial reward from the packers, in that we are not classified as Modified Accredited Free Areas, and do not get a premium for our cattle or hogs. We believe that we are entitled to a premium and that our cattleman should receive his just reward for raising and maintaining clean cattle.

To do this work has entailed considerable hardship upon the personnel of the various Live Stock Sanitary Boards, and has required the active and consistent support and co-operation of the cattle grower.

In the northern range states, our winters are long and cold. In the mountainous districts, our roads are impassable a goodly portion of the winter. Many of our cattle during the summer months are on Forest Reserves where it is impossible to reach them. They do not come down to the lower pastures until driven out of the hills by snow. That means that, if they are to be tested, they must be tested during the late fall or winter months, for the simple reason that they are not available during the summer, and hay conditions generally require that they be turned out on the range in the spring with the coming of green grass.

The intradermic tuberculin test has made it possible to test range cattle but even with this test many hardships are encountered. Stockmen do not like to handle or work their cattle during winter months. Every time you handle cattle they lose so much flesh. If cattle start to lose flesh in winter it is next to impossible to get them back into condition again until the following summer. To test unbroken cattle requires that they must be handled through a chute, held in a close pasture for three days, and then run through a chute again for observation. The veterinarian's task is by no means easy. He has to travel over snowy roads, using skis, snowshoes, bob sleds, or on horseback, as occasion demands. He also has to keep his tuberculin from freezing. This requires him to carry tuberculin in a well protected inside vest, or when actually testing requires the placing of the bottles containing the tuberculin in a can of warm water placed near a fire. Very few of our field veterinarians go through the winter without freezing their fingers or faces.

In the southwestern range states the problem is slightly different. They do not have to contend with so many adverse winter conditions. Their's is a problem of actually getting in contact with the cattle. There are many districts in southwestern states where bulls and other animals are never gathered and taken from the open range. They run all the year around in a mesquite and broken country, and are wilder than the proverbial wild cat. To corral and test such cattle is a task that even the bravest heart might well desire to sidestep, and especially
so, when the chances are the number of tuberculous animals found would be well under the so-called irreducible minimum.

It is possible, that in my mentioning Modified Accredited Tuberculosis Free Areas, it may have appeared that I have gotten away from the subject, "The Problems of Tuberculosis Control in Cattle Under Range Conditions." The Modified Accredited Tuberculosis Free Area plan, however, is one of our problems. If Western cattle growers do not receive financial recognition for the work they have already done, and receive recognition under the Accredited Tuberculosis Free Area plan, then so far as the testing of range cattle is concerned, we are about to reach an impasse.

Western range states cannot adequately police numerous districts or counties within their respective states. They can adequately police their state boundaries, and protect themselves against imported infection by purchasing from Accredited Herds or from modified accredited tuberculosis free areas, or by the 60-90-day retest. They can also quarantine against infected areas or herds within their state by quarantine and police regulations because there will not be many such infected districts. The presence of these infected areas can be demonstrated and proved by testing all bulls, pasture cattle and dairy cattle in given districts, and by post-mortem reports from the Meat Inspection Division of the U. S. B. A. I. At this time it is respectfully requested that the Federal Government enlarge upon this phase and that the Meat Inspection Division furnish state officials with an itemized report of tuberculous cattle received from their state.

We believe that Western states, where co-operative testing and Federal post-mortem reports show that tuberculosis in such states is less than one-half of one per cent, should be classified as Modified Tuberculosis Free Areas, provided that adequate sanitary police measures are enforced within the respective states for the proper quarantine of infected herds, and areas which are classified and designated as infected areas, by co-operating Federal and State authorities.

PRESIDENT FERNEYHOUGH: Gentlemen, we are on a most interesting subject now. That is, tuberculosis, and I do hope we will enter into a full discussion this afternoon. We did not have quite as much discussion on the papers read this morning as I would like to have seen.

The next on the program is "Tuberculosis and Its Transmission," by Dr. C. H. Mayo, Rochester, Minn. Is Dr. Mayo present? (Not present.)

"The Sources of Swine Tuberculosis," by Dr. L. Van Es, Department of Animal Pathology and Hygiene, University of Nebraska, Lincoln, Nebraska. (Applause.)
A REPORT ON THE PART PLAYED BY AVIAN INFECTION IN THE INCREASE OF SWINE TUBERCULOSIS.

By L. Van Es, Nebraska Agricultural Experiment Station.

During the last meeting of this Association a preliminary report was made of certain experiments undertaken by the Nebraska Station in order to throw light on the cause of the increase of tuberculosis of hogs. As this investigation has recently been completed a brief statement of its final results may not be without interest to this audience. It was undertaken to throw light, if possible, on the cause or causes of the increase in the tuberculosis of swine, which during recent years has attracted an ever increasing amount of attention.

A study of this increase by itself revealed a most interesting phenomenon. When the statistical data pertaining to abattoir retentions and condemnations are analyzed it appears that the number of retentions increased from 13.83 per thousand animals slaughtered in 1907 to 163.87 per thousand animals slaughtered in 1922.

A graphic representation of this increase is shown in Fig. 1, while the incidence of retentions and condemnations in cattle during the same period is revealed in Fig. 2.

It will be observed that the line showing the retentions of cattle does not present very marked deviations from one approaching more or less a horizontal position. It will also be noted that the line representing the condemnations of cattle in a measure retains a certain parallelism to the retention curve.

On the other hand the lines for swine retentions and condemnations present an entirely different behavior toward one another. The graph shows how the retention curve climbs and mounts almost without halting, while the condemnation curve maintains a practically level position throughout the entire sixteen year period.

Thus the type of tuberculosis of swine which leads to condemnation has not materially increased during those years, while the type of localized, non-progressive tuberculosis, not resulting in condemnations, has in the same time grown more than twelve times in frequency.

A study of the data presented makes it apparent that there is a discrepancy between the incidence of bovine and swine retentions on account of tuberculosis which, to say the least, somewhat denies the prevailing theory that most if not all tuberculosis in swine is traceable to tuberculous cattle.

Two conspicuous facts stood out as a possible explanation of the phenomenon described and offered a hypothesis to be proven or disproven by actual investigation.

On the one hand it has been known for 20 years that swine are susceptible to the tuberculosis naturally occurring in poultry and on the other hand it is equally well known that tuberculosis among farmyard poultry has, since 1907, enormously increased its prevalence in a very large section of the country of which Nebraska forms a part.
RETENTIONS AND CONDEMNATIONS, ON ACCOUNT OF TUBERCULOSIS, PER 1000 HEAD OF SWINE SLAUGHTERED BETWEEN 1907 AND 1922

RETENTIONS AND CONDEMNATIONS, ON ACCOUNT OF TUBERCULOSIS, PER 1000 HEAD OF CATTLE SLAUGHTERED BETWEEN 1907 AND 1922
An attempt was therefore made to ascertain the type of tubercle bacillus present in the lesions which gave rise to the preponderating number of retentions of swine for tuberculosis at abattoirs handling animals originating on Nebraska farms.

A hypothesis to be proven or disproven by experiment, that the greatest number of retained swine contracted tuberculosis from infected poultry flocks, thus presented itself and hence the Nebraska investigations were carried on with this evident possibility in view.

The material used in the investigation consisted of tuberculous lymphnodes obtained from swine affected with the type of localized tuberculosis responsible for the increased number of retentions to which your attention has already been called. This material was secured through the courtesy and enthusiastic co-operation of the inspectors in charge of Federal meat inspection stations at Omaha, Sioux City, Nebraska City and St. Joseph and to whom no small amount of credit for the success of the inquiry is due.

In the Nebraska experiments the classification of the infection type was altogether based upon the results of animal inoculation tests in which cavias and fowls were used. A certain number of strains of bacilli responsible for the disease in swine were also isolated, but in the final conclusions only the inoculation evidence was considered.

When the mammalian type was found in the lesions it was not typed any further, although this was provided for in the experimental plan in case such findings should be sufficiently numerous to warrant further differentiation. As the work advanced, however, this point became of minor interest.

The following were the results obtained with the lymphnodes secured from 209 shipments of tuberculous swine in which typing yielded definite indications.

**Nebraska Inquiry into the Causes of Swine Tuberculosis.**

*(Final results.)*

*(Table No. 1.)*

<table>
<thead>
<tr>
<th>Infection types</th>
<th>No.</th>
<th>Per cent</th>
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<td>Mammalian</td>
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<tr>
<td>Avian</td>
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<td>88.51</td>
</tr>
<tr>
<td>Mixed</td>
<td>13</td>
<td>6.22</td>
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<tr>
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<td>209</td>
<td>99.94</td>
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The results of the Nebraska inquiry clearly indicate that contact with avian infection is responsible for a preponderating portion of the cases of swine tuberculosis subject to retention at packing establishments and that there is warrant to believe that the great increase in the incidence of that type of swine tuberculosis is but a consequence of the great prevalence and spread of tuberculosis among farm poultry in the areas involved.

Certain observations made in the field, indicate in a singularly clear manner that the conclusions which can be based upon the result of the Nebraska inquiry, just now related, are in perfect accordance with the truth of the matter.
Through the valuable assistance of the inspector in charge of tuberculosi s eradication in Nebraska it was possible to secure a small number of surveys on farms where some of the material used in the inquiry originated.

Sixteen surveys were completed and in every single instance the 15 farms from which material showing avian infection was secured, had tuberculous poultry flocks and on 14 of those the poultry were the only source of infection, while on one farm tuberculosis existed among poultry as well as among cattle.

Only one farm from which material showing mammalian infection was obtained, was surveyed and here the cattle were found to be infected, while the poultry showed absolute freedom of tuberculosis.

It is further significant that on the farms surveyed a considerable number of swine tested with both avian and mammalian tuberculin only gave positive reactions against the avian tuberculin.

The other field observation which sustains the conclusions based on the Nebraska investigations is associated with the fact that swine originating in the bovine tuberculosis free area of Hillsdale County, Michigan, furnished a conspicuous number of retentions for tuberculosis when slaughtered.

It was possible, through the courtesy of the Live Stock Commissioner of the National Stockyards to include the tuberculous lymphnodes of fourteen consignments of Hillsdale County swine in the Nebraska investigations. In thirteen of these avian infection only was found, while in the remaining one, avian infection was present also but in association with bacilli of the bovine type.

The results of the Nebraska investigation tend to show that poultry tuberculosis is an important source of the disease in swine. In all measures directed against swine tuberculosis this fact should be given full recognition, but at the same time the fact should not be lost sight of, that while avian infection in many parts of the country is responsible for the bulk of the losses caused by retentions of swine, bovine infection, through its greater virulence, can be held accountable for the greater number of outright condemnations.

Control measures need revision only in so far that instead of having to confront one important fountain head of infection, another one, fully as potent of mischief, has also to be reckoned with.

MR. SMITH: Dr. Van Es made reference to the Roselle County hogs. I think you men would be interested in some figures I have just compiled from reports received yesterday. Out of a total of 23,454 hogs from the county, slaughtered in Buffalo, nineteen per cent were retained for tuberculosis. That means nineteen per cent of those hogs had avian tuberculosis.

However, I want to make this clear and I was afraid you might have some misconception of the fact that it has eliminated almost entirely the condemnation in hogs. Out of the total of 23,454 hogs on which the premium of ten cents had been paid, there were only seven condemned
and fourteen sterilized. The loss on a condemned head is around fifty cents, and I just want to say the Buffalo packers have not yet complained about paying the premium.

We hope to eliminate these retentions. Through the cooperation of the college at Michigan, the federal bureau and the county providing funds, a systematic campaign has been started in Hillsdale County to cull out all the stocks with the hope of eliminating the retentions which now amount to nineteen per cent which is not very far below normal. But I want you to know it has eliminated almost entirely the condemnations in that county.

PRESIDENT FERNEYHOUGH: Of course, as you know these papers will be discussed later. The only objection to discussing the papers later is you are too apt to forget the contents, but we have to go according to the program. We have to remember what is there.
COMPARATIVE LESSONS IN INFECTION, DETECTION AND CONTROL OF TUBERCULOSIS.

By Herbert Fox, M. D., from Laboratory of Comparative Pathology, Philadelphia Zoological Garden, and from the William Pepper Laboratory, University of Pennsylvania.

I appreciate very much the opportunity of bringing before you the work in which I have been interested, and the fact that you were good enough to extend your invitation to me to speak at this meeting.

The work in tuberculosis at the Philadelphia Zoological Garden has been undertaken for the purpose of hygiene and of collecting data that will be of value to human pathology and that of domestic animals. Our problems are not like yours since we do not have animals under commercial conditions where large numbers are concerned, but consider the health of many varieties of strange kinds in small groups that have to be handled and housed as best they can.

The two points I shall discuss this afternoon are: First, how wild animals acquire tuberculosis, and the relation to the disease in man and domestic animals; and second, the detection of tuberculosis in the most susceptible of mammals, the monkey. By our success in the latter, we have been able to collect what Hagenbach has said is the finest collection of monkeys in the world.

The origin and history of tuberculosis is not known for man, so that it can not be known for domestic and wild animals. Tuberculosis is a disease of flocks, and gregarious habits of animals seem to have favored its propagation. Certainly this is true in the human being, the most gregarious of all animals. However, the incidence of tuberculosis in wild animals does not strictly follow the gregarious habits of the different varieties. One might mention that wolves, some of the anserine birds and some varieties of rodents do not easily become infected even when exposed.

Tuberculosis does not occur in the wild. In the first place, if it did, many gregarious animals, doves, pigeons and certain monkeys would be extinct. It is probable that tuberculosis did not occur in prehistoric times, since Moody and Sir Armand Ruffer, who studied paleopathology, were unable to find satisfactory evidences of the disease in fossils. It is, therefore, probable that tuberculosis is of relatively recent origin. One of the features that one may draw from these statements is that the disease as we see it in menageries would almost certainly reflect the natural response of wild animals to the virus when once they meet it. The following is an outline of the response to the disease given by the zoological groups.

The order Primates, to which man belongs, seems to be the most susceptible of mammals, and perhaps of all animals. This group presents rapid, progressive, productive tuberculous inflammation, and, on occasion, slow cases with fibrosis or calcification. These animals take the bacillus into their bodies by either inhalation or deglutition, chiefly,
however, by the former. The next zoological order, Lemures, is essentially the same.

The Carnivora show characteristicly a chronic fibroulcerative type of disease, tending to cavitation. The Ungulates present lesions such as you know in the domestic animals. The wild ones show, perhaps, a greater chronicity than do the domesticated ones.

The next important group, the rodents, presents very decided variations in susceptibility and receptivity to tuberculosis. The whole order cannot be judged by the laboratory rodents, since some of the wild ones are quite resistant.

The marsupials, the next zoological group, apparently have an exceedingly low incidence of the disease. We have seen no cases in this order at the Philadelphia Gardens among over two hundred autopsies, although there is on record one in London. Marsupials are represented in this country by the opossum only, while there is in Australia a large number of varieties. Just why they are not susceptible to tuberculosis, that is they seem to have no receptivity, is not clear, because they have respiratory, alimentary and lymphatic organs that correspond in anatomy to other carnivorous, omnivorous and herbivorous animals, and therefore have a structural formation that would seem to offer infection atria similar to those animals that have a high receptivity. Moreover, the various genera have habitats and diets that correspond to other kinds of animals that are reactive.

Birds have a high receptivity and susceptibility to tuberculosis. The type of disease is essentially the same throughout the class. Certain varieties of the Galli and Columbæ, for instance, have a very high incidence of disease, whereas the Herodiones seem to have no receptivity for the organisms. Other water birds like the Odontoglossæ and the Fulicaræ have also no receptivity. I have tried to explain this lack of receptivity on the part of the water birds to the character of the food and to the habits, but I have been unable to adduce data that satisfactorily prove this point, nor will the same argument hold for the mammals.

The features that I have discussed are shown in the lantern slides. The first one is monkey tuberculosis, possibly bovine in type, with the characteristic masses in the spleen, nodular lesions in the lung, small ones in the liver, and, on the pleura, what is probably a group of pearl nodules. The next is the chronic ulcerative tuberculosis in a tiger with beautiful cavitation, the blood vessels running across the middle of the cavity. The next one is the ordinary caseous, ulcerative and peribronchial tuberculosis in an antelope, a type with which you are familiar in the domestic animals. The next is an unusually fine specimen of pearl disease, also in an antelope. The next slide illustrates the progressive, centrifugal tubercle of the bird. The liver is largely replaced by the extending growth which destroys and replaces tissue as it spreads out. The intestinal lesions with the tumor-like outward growth are also illustrated. In this variety particularly is centrifugal growth the rule, coalescence being inconspicuous.

The next four pictures illustrate the miliary tubercle as it is found
in man, monkeys, cows and birds. The human tubercle has a loose but very definite construction, with its well defined rim of lymphoid cells, a wide irregular zone of epithelioid cells, moderate numbers of well formed giant cells, and the ordinary central necrosis. It does not invade the tissue as does the next variety, that of the monkey, where the epithelioid cells seem to be growing rapidly and centrifugally. Giant cells are less conspicuous, the rate of spreading too rapid for their full formation. The bovine tubercle is a much more strongly constructed affair, its cells smaller, it seems less invasive and the fibrous tissue is more prominent. Giant cells are somewhat more numerous and caseation is less perfect. The avian tubercle is centrifugally growing but it seems to stimulate or gather about it a sort of fibrous tissue capsule which, however, proves to be inadequate to prevent spreading. Giant cells when they occur impede rather than hasten spreading, which characteristic is favored by masses of epithelioid cells. Giant cells do not occur within the caseous center but around the edge. Caseation practically always contains much chromatin debris.

Having shown the differences in receptivity, susceptibility and anatomy, one naturally asks where lies the difference. Is it in the bacillus? Is it in the animal? We think that it is in the latter.

Analyses of our records show that mammals have more tuberculosis than birds. In the mammals both the intestine and the lung are used as a starting point of the disease, while in the birds the alimentary tract outweighs the respiratory tract as 5:2. Mammals show nearly twice as much tuberculosis of the lungs as do birds. The varieties of both classes that have the greatest percentage respiratory tract disease and the greatest amount of disease tissue, have the greatest death rate. The animal that has two of these features, the monkey, has, as we have said, the greatest susceptibility of all. Incidentally, it might be said that these animals actually die of tuberculosis, whether or not the human being or domestic animal does so, it having been often questioned as to the role of tuberculosis in the actual fatal outcome.

This variation is not entirely a question of opportunity or accident, since the figures upon which I am basing my statements have been collected over a score of years and are substantiated in the main by experiences in other gardens. Moreover, all these animals have been in the same surroundings and subjected, so far as possible, to the same conditions. They have had the opportunity of meeting all kinds of tubercle bacilli, and all varieties of tubercle bacilli having been here, it is more logical to interpret the incidence of the disease in terms of the natural reaction of the animal than to a capability of infection on the part of the organism.

Heterologous infection is well known of course. We have demonstrated human tubercle bacilli in gallinaceous birds. We have seen bovine tubercle bacilli in a duck and a monkey, and human bacilli also in these two varieties. I think we have had one case of avian tuberculosis in a coati.
A very definite evidence of individuality is given in the following examples. The primates consist of four great families: the Simiadae or great apes, the Cercopithecoidae or old world monkeys, the Cebidae or South American monkeys, and Hapalidae or marmosets. The first three groups are exceedingly susceptible. The last group has shown no disease at all although amply exposed.

The question of susceptibility is again illustrated by the incidence of tuberculosis in the bird house as shown in the lantern slides. The Galli and Columbae have been housed in one part of our exhibition house for six years, and to that part tuberculosis is very largely confined. When it spreads it is only to susceptible varieties. When tuberculosis happens to occur in other cages, as you will see by the chart, it does not spread from them. This is largely because non-susceptible birds are beside these cages. The most striking illustration of susceptibility is in the large central flying cage. Here in the last six years two hundred and fifty birds have been housed, one hundred and fifty being of the non-susceptible variety, one hundred of the known susceptible varieties. In the non-susceptible, four cases have developed. In the hundred susceptible, eleven have occurred. These data seem to indicate that individual receptivity and susceptibility are of considerable importance in the development of tuberculosis and that this is a quality of the animal, the type of bacillus being of secondary importance.

The type of tuberculosis as seen in the monkeys is comparable to the type seen in human youth, and the mortality is likewise comparable. Its pathological behavior is essentially the same in these two animals. As the disease is seen in later life in the human being, tuberculosis approaches that seen in the carnivores and ungulates which animals are known to have some degree of resistance.

What bearing can this have on the struggle against tuberculosis? Are we justified at the present time in an extensive immunization of human beings against the disease? This question, of course, can only be answered by wider experimentation; but, should we immunize at a time that the human disease approaches in many characters that of the most susceptible of all mammals?

So far as I know tuberculosis never heals in monkeys nor does it ever assume the retrogressive form that we know in carnivores, ungulates and some adult human beings. It is to be hoped that Calmette with his recently discovered non-pathogenic strain will be able to show us some valuable results. He is fortunate in starting with a zoological order that has some resistance naturally. If we immunize human beings against tuberculosis, can we hope that this will be permanent and transmitted to posterity?

I wish now to discuss the history and results of the tuberculin testing of monkeys. A score of years ago this disease carried off about 75 per cent of all these animals that were in the collection long enough
to be exposed. The detection of tuberculosis by ordinary clinical methods is practically impossible. The cutaneous and ophthalmic tests are not practicable. The subcutaneous tests have been found to be entirely dependable. Of course, experimentation was necessary to discover the normal temperature of monkeys and the effect of subcutaneous injection of tuberculin in the normal and affected animals. The dosage as finally worked out amounts to 1 mg. for the initial five pounds or less of the animal's weight, and .5 mg. for every additional five pounds. The temperatures are taken by rectum every four hours, 3-7-11. It is found to perform a regular rhythmic curve during 24 hours with its highest point at 3:00 p. m., and the lowest point at the corresponding hour in the morning. The injection of tuberculin into a tuberculous animal is followed by a destruction of this rhythm. This is usually ushered in by a distinct rise with 8 hours. Sometimes, however, when the disease is inactive, or the material has been injected in a lump under the skin, the reaction may be delayed 24 hours. All our observations are made for 48 hours.

The slides illustrate the normal temperature of monkeys and selected examples of typical reactions in tuberculous specimens. The illustrations given are taken for animals that are now dead so that the statements of the existence or non-existence of tuberculosis have been verified. The character of reaction and the abnormalities are very well illustrated and show especially well destruction of the normal daily rhythm. Occasionally in a very sick monkey, instead of a rise of temperature, a rapid and continued fall will be seen. This type of reaction is well known in human and veterinary medicine.

After the test was established, the monkey house was emptied, disinfected, scrubbed and painted. Partitions were put between the cages extending out so that there could be no communication one with another. Bedding hay was removed when the animals could do without it. New separate utensils were supplied for each cage. Every monkey was tested and only non-reacting animals returned. The result of this test and the history of its results are shown on the slide. The drop of total mortality of monkeys when the test was completed is perfectly obvious, so that instead of having 70 per cent mortality, there followed the years of 1908 and 1909 where it was less than 5 per cent. In 1910 we had the misfortune of allowing a tuberculous animal to slip through, and for the next two years we had 50 per cent mortality from the disease until again we had cleaned out the entire house and returned only non-reactives. Since that time, 1914, we have had but three cases of tuberculosis in the exhibition house out of a total of about 250 monkeys. As can be seen from the charts, the exhibition period in 1906 was 15 months, in 1921 it was 30 months, and at the present time, it is nearly 50 months.

This indicates our method of the control of tuberculosis in monkeys. Other varieties are handled occasionally by tuberculin tests, but usually
by segregation. At present birds cannot be tested with tuberculin because wild varieties do not like to be handled.

The lantern slides will also illustrate tuberculin reactions in some other animals. The bactrian camel has a temperature varying from 97 to 102. We have had no positive tuberculin reactions in them. The American bison has a very uniform temperature between 102 and 103. Its positive reactions resemble very closely those of the domestic cow. The Virginia deer has a very variable temperature—100 to 103. We have had no tuberculosis among them.

I cannot lose an opportunity of pointing to the lesson in hygiene of tuberculosis as illustrated by our experiments with the monkeys. If so much can be done for the most susceptible and least cooperative mammal, how much more can be done for the potentially cooperative and presumably intelligent human being!
PRESIDENT FERNEYHOUGH: I will now ask Hon. J. D. Jones, Jr., to address you gentlemen. His subject will be "Tuberculosis Eradication in Wisconsin from an Administrative Standpoint."

TUBERCULOSIS ERADICATION IN WISCONSIN FROM AN ADMINISTRATIVE STANDPOINT

By John D. Jones, Jr., Commissioner of Agriculture.

The wording of the topic assigned to me for presentation in this paper makes it unnecessary for me to discuss the necessity for the application of the tuberculin test to the cattle of the State; the relationship between bovine tuberculosis and that in the human, or the necessity for creating public sentiment to the end that the work may be carried on.

It will suffice that I suggest that the tuberculin test was introduced into the State of Wisconsin by H. L. Russell, now Dean of the College of Agriculture of the University of Wisconsin, in the early nineties; that its usefulness as a diagnostic agent was demonstrated by him at or about the time; that the work among the herds of the state had its inception between twenty-five and thirty years ago, and that since that time its development has been a matter of steady growth.

I feel safe in saying that a large majority of the cattle owners of Wisconsin at this writing realize the necessity for the eradication of bovine tuberculosis from their herds. In the calendar year, 1923, in excess of 56,000 head of pure bred and grade cattle were sold from Wisconsin herds to buyers from points without the state. These cattle were purchased in almost all of the leading dairy counties of the State, and the buyers, without exception, required that the animals purchased be accompanied by satisfactory health certificates indicating that they were free of bovine tuberculosis. Many cities located both within and without the state that are supplied with milk in whole or in part from Wisconsin dairies have enacted ordinances requiring that the dairy cattle supplying such milk shall have passed a satisfactory tuberculin test before they are eligible to supply milk for such markets. In addition to these factors cattle owners in increasing numbers are coming to realize that diseased animals are inefficient and for that reason desire that unhealthy animals be removed from their herds and that their neighbors follow the same program in order that infection may not be transmitted from one herd to another.

The sentiment of cattle owners with respect to testing is best demonstrated by the fact that there are now on file with the State Department of Agriculture petitions from cattle owners from thirteen counties, which include within their borders 605,313 cattle.

In addition thereto, the demand for testing under the State-Federal Accredited Herd Plan cannot even nearly be complied with; and the funds available for testing under the so-called State plan-tests in the last instance being applied by practicing veterinarians approved for that purpose—were exhausted within the first 36 days of the present fiscal year.
Tuberculosis eradication is one of the large jobs assigned by the Legislature to the Wisconsin Department of Agriculture. Authority for the conduct of this work as well as general supervision of the health of the live stock of the state is vested in a Live Stock Sanitary Board, there being three ex-officio members: The State Commissioner of Agriculture, the Director of Live Stock Sanitation, and the State Bacteriologist of the College of Agriculture; and four additional members, who must be bona fide breeders of live stock. This Board is given ample authority by law to enforce legislative enactments and to promulgate such rules and regulation as in the judgment of the Board may be necessary to safeguard the health of the live stock of the state, which rules and regulations have in effect the force of the law.

The plan of bovine tuberculosis eradication is based on three plans of testing named in their order of importance; The Area Plan, under which the county is the unit; the Accredited Herd Plan, and the testing done by local veterinarians.

The total annual state appropriation for the present biennium amounts to $550,000, divided, as follows:

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In addition thereto the sum of $150,000 per year has been allotted to Wisconsin by the Federal Bureau of Animal Industry for the payment of indemnities in area and accredited herd work, both of which are on a cooperative basis.

To conduct the area work a force of fifteen men, under the immediate direction of a competent field leader, tested in the fiscal year, ending June 30, 1924, all of the cattle in seven counties, which contained 22,435 herds and 341,137 cattle, at an average cost of 17 1/7c, the maximum being 22c, and the minimum being 14c per head; 5,216 reactors were removed from these counties; the per cent of infected cattle ranged from 8/10ths of 1 per cent to a maximum of 2.5%, with an average of 1.49; 88.5% of all of the herds examined passed clean tests, and 11.5% of all herds showed infection to a greater or less extent. In addition thereto to six counties retests were applied to 836 herds in which infection had previously been revealed, with the result that 201 reactors were removed from herds containing 13,808 cattle, and the per cent of herd infection ranged from 0 to a maximum of 17.43, which indicates clearly that progress is being made in the eradication program.

Not a little of the effectiveness of this work is due to the requirements; first, that reactors must be removed within thirty days subsequent to the application of the test, and that the premises, in which the reactor cattle were maintained, must be thoroughly cleaned and disinfected within ten days subsequent to the removal of reactor cattle, if indemnity claims are to be approved for payment by the State Department.

Up to date, twenty-three Wisconsin counties, containing in excess of 700,000 cattle have been tested under the area plan, and in two in-
stances complete retests have been applied to all of the cattle within the two counties. The general area plan contemplates successive tests applied to infected herds at six-month intervals until a clean test has been had, and country-wide tests to all cattle at three-year intervals. Under this plan, when infection is reduced to $\frac{1}{2}$ of 1 per cent, these counties may be designated as modified accredited areas by the United States Department of Agriculture.

Regulations governing the movement of cattle to points within counties under area test supervision provide, that cattle may be introduced only if coming from accredited herds, from areas designated as modified accredited by the Federal Bureau of Animal Industry, or that are accompanied by a satisfactory certificate of health, signed by an approved veterinarian, indicating that such cattle have passed a clean test within six months prior to the date of introduction. Exceptions are made in the case of feeding steers introduced under permit or butcher stock also moving under permit, issued by the Director of Live Stock Sanitation, after an affidavit has been submitted by the owner, that said butcher stock will be slaughtered within thirty days subsequent to the date of introduction.

Under the so-called State-Federal Accredited Herd Plan there were tested during the fiscal year, ending June 30, 1924, 6,047 herds, containing 149,072 cattle; 3,224 reactor cattle were removed for slaughter; the per cent of infection was 2.1; infection was revealed in approximately 20% of the herds, and 80% passed one clean test. Five thousand two-hundred thirty-five herds, containing 117,549 cattle are now fully accredited. This work is under the direct supervision of the Federal inspector, assigned to Wisconsin for cooperative work.

Under the so-called State plan, approximately 100,000 cattle were examined, and 558 pure bred and 4,298 grade animals were disclosed as reactors. The average per cent of infection revealed under the last named plan is approximately 4.8, infection being found in approximately 40% of the herds. The per cent of herd infection as revealed under this plan is necessarily high for the reason that much of this work is carried on in the southern counties where the disease has obtained a firm foothold, and tests in many instances were applied to herds known in advance to be infected.

Generally speaking, testing by Local Veterinarians is regarded as preliminary to herd supervision under the State-Federal Accredited Herd Plan, and both in turn contemplate as soon as public sentiment is sufficiently crystallized and adequate funds are available the application of a general test to all cattle of the community under the Area Test Plan.

For area work the Wisconsin Department of Agriculture deems it advisable to engage a relatively large force of full-time men, under the constant supervision of a leader fully responsible for the conduct of the work, and that once the work is started in a county, it be prose-
cuted as vigorously as is consistent with thoroughness. In those coun-
ties where 60% of the cattle owners, as required by the Area Test stat-
ute, have not petitioned for a general test, but where numerous herd
owners desire that their herds be maintained free of the disease, the De-
partment sees no reason why competent, established veterinary practi-
tioners cannot conduct the work with just as great a degree of efficiency as
might be done by the so-called resident county veterinarian. In fact,
the Department is of the opinion that the interest of the live stock own-
ers of the state demands that competent and scrupulous established
veterinary practitioners be given due recognition in the bovine tubercu-
losis eradication program.

To prevent the introduction and spread of the disease, feeder cat-
tle, except steers moving to points within the state, must be accompa-
nied by health certificates. Butcher stock moving from points without
or within the state must be moved under permit, issued by the Director
of Live Stock Sanitation, and after affidavit has been supplied by the
owner indicating that such stock will be slaughtered within thirty days.

All cattle moving from public stockyards located in any city in
Wisconsin, where public slaughtering establishments are maintained,
must be tuberculin tested prior to the removal and reactors properly
disposed of, and a state inspector is stationed at the Milwaukee Stock
Yards for the supervision of such work.

I might suggest at this point, that at the close of the fiscal year
ending June 30, 1924, a careful consideration of the year's work by
State and Federal officials indicated that a question of policy with re-
spect to future accredited herd work must be decided upon. During the
preceding year, under the Cooperative Area Plan, 19,824 herds, contain-
ing approximately 297,360 cattle had passed one clean test. It was
apparent that if all or a large part of these clean tested herds passed
a satisfactory combination test one year subsequent to the application
of the first test, that the accredited herds, then numbering approxi-
mately 5,000, could easily be multiplied by 3 or 4, and that the total
number of cattle in Wisconsin herds fully accredited could easily be in-
creased in the same ratio. In view of the fact, however, that these
herds were located in area tested counties and were, therefore, under
supervision, and in view of the large number of herd owners in non-
area tested counties, whose demands for attention could not fully be met
in view of the inadequacy of funds available for such work, the con-
sensus of opinion of State and Federal officials was that the opportu-
nity to largely augment the number of accredited herds had best be
disregarded, and that funds which would of necessity have been expend-
ed in this connection might better be utilized in non-area tested coun-
ties.

The intradermal test is generally employed in area and accredited
herd work. The Department is of the opinion that the intradermal
test is eminently satisfactory when applied by men skilled both in injec-
tion and in the interpretation of the results of the interjection at the
seventy-second and one-hundred twentieth hours.
In conclusion, the Department is of the opinion that permanently satisfactory results must come from intensive rather than extensive work and from sustained rather than from spasmodic effort. If it can be said that bovine tuberculosis eradication work in Wisconsin is attended by a reasonable degree of success, such success is due not only to the painstaking character of the efforts actually put forth by the men in the field, but also to the complete understanding that exists between State and Federal officials, the cooperation of the State College of Agriculture, the Live Stock Sanitary Board, the Legislature, which has provided substantial if not adequate funds for the prosecution of the work, and last but not least to the determination and enlightened vision of many thousands of cattle owners throughout the State of Wisconsin, whose desire that all Wisconsin herds be made tuberculous free.

PRESIDENT FERNEYHOUGH: You will all quite agree that was a most interesting paper.

Has Dr. Mayo come yet? We are very anxious to hear from Dr. C. H. Mayo of Rochester, Minnesota.

As Dr. Mayo is not here, the next paper is "The Cause of Skin Lesions in Tuberculin Reacting Cattle," by Drs. B. A. Beach and E. G. Hastings, Department of Agricultural Bacteriology, University of Wisconsin, Madison, Wisconsin.
SKIN-LESION AND NO-LESION TUBERCULOSIS REACTING CATTLE.

By Drs. B. A. Beach and E. G. Hastings, College of Agriculture, University of Wisconsin.

Soon after the discovery of the tubercle bacillus and the recognition of its peculiar relation to stains and to decolorizing agents, especially acids and acid alcohol, other bacteria possessing similar properties were found. As the years have passed a great group of acid-fast bacteria has been established, which includes three important pathogenic organisms: the tubercle bacillus in its three types—bovine, human and avian, the leprosy bacillus, and that of chronic dysentery of cattle—the so-called Johne's bacillus. Other less important pathogenic forms are members of the group.

The non-pathogenic acid-fast bacteria have been found in many places in which it is certain they have grown, rather than having been carried there from other sources. They have been found on the surface of the animal body, especially of man, in the intestinal content, especially of cattle, and on grains. They have been found in the content of abscesses in man and lower animals, and here the question presents itself as to whether they represent the primary cause or secondary invaders. They have been found in the sputum and in tonsil crypts.

The various members of the group are much alike in morphology, being on the whole slender bacilli. Some are easily grown on the common media of the laboratory, while others can be grown only on special media, still others have not been grown in artificial culture.

The study of various members of the group as regards their reactions with immune sera has shown that there are varying degrees of relationship, some apparently quite intimate, others less so, and that any immune reaction is not sufficient to identify any particular member of the group from its close relatives, or to indicate in all cases the particular organism that is the cause of infection in an animal. These relationships have been brought to light in the agglutination reaction and in that of the complement fixation. So far as the writers are aware, but two cases of such a relationship have been found in reactions occurring in the animal itself, namely, the reaction of some animals suffering with Johne's disease to avian tuberculin, and the reactions of some affected with lymphangitis, probably due to acid-fast bacteria, with ordinary tuberculin.

There seems to be abundant evidence to indicate that infection with some unknown member of the group may be detected through the use of another member of the group or of its products, as for example, animals free from tuberculosis, but infected with another acid-fast organism, may react to tuberculin. It is along this line we wish to present some data.

The no-lesion tuberculin-reacting animal has been of interest to us for many years. A number of years ago the students in the College of Agriculture of the University of Wisconsin were taught to apply the
tuberculin test to their cattle. The result was the examination of a large number of herds, which apparently were free from tuberculosis as far as the herd history could indicate. In many of these herds, reactors were found which, on slaughter, failed, in a high percentage of cases, to show any lesions of tuberculosis. A possible explanation presented itself for the cases of no-lesions, namely, faulty technique by untrained men.

As tuberculin testing has become more general and as all herds in great areas have been examined, the no-lesion cases have increased percentagely, until now, in the case of animals tested by men of much experience, they are as frequent as noted in our earlier experience, when the type of herds examined was very comparable to that included in the present area work.

As the no-lesion cases increased the inspectors, in efforts to find evidences of tuberculosis in reacting animals, extended the field of observation to the skin where they found, in many cases, roughened areas on the inner surface which were believed tuberculous in nature and origin.

It seemed desirable to determine if this supposition as to the nature of the skin lesions was correct, and if not to find, if possible, their cause. For this purpose we have examined a considerable number of skin lesions from tuberculin-reacting cattle. These lesions were furnished us through the courtesy of Dr. A. E. Behnke, inspector in charge at Milwaukee. They came from animals showing no internal lesions of tuberculosis. We have collected no evidence concerning the extent of the disease in the herds from which the animals in question came.

The first set of specimens, 23 in number, were examined microscopically for acid-fast bacteria. A number of slides were prepared from each specimen, and a rather extensive search for acid-fasts made. The tissues were inoculated onto Petroff’s medium, both before and after treatment with antiformin. Guinea pigs were also inoculated from the lesions. These animals were killed from sixty to ninety days after inoculation. The results of the animal inoculation and of cultures were negative in every instance. In the microscopic examination, seven of the twenty-three lesions showed acid-fast bacteria. They were few in number in all but one.

A second set of specimens was examined in the same manner microscopically. Acid-fast bacteria were found in eight of the twenty-one. Two specimens showed many acid-fasts, the remainder but few. Thus out of the fifty-four skin lesions coming from as many tuberculin-reacting cattle, acid-fast bacteria were demonstrated microscopically in fifteen, or 27 per cent. Material from each of the lesions of the second set was injected into guinea pigs and into hens, and was also cultured. The birds upon slaughtering 120 to 180 days after injection showed no lesions of tuberculosis in any instance. This would confirm the evidence of Day of the Bureau of Animal Industry, who fed chickens for a considerable period on skin lesions from 113 animals, and did not succeed in producing tuberculosis in any of the birds.

The data collected by the Bureau of Animal Industry show that skin lesions occur in about 3 per cent of the tuberculin-reacting cattle. It
would seem from the data presented that these lesions cannot be tuberculous in origin or in nature. It seems possible from the work of Traum on lymphangitis that they are produced by some acid-fast organism.

There still remains a residue of reacting cattle in which no lesions can be found after the skin-lesion cattle have been excepted. In the area work in Wisconsin all herds in twenty counties have been tested. The number of animals involved was 387,180, of which 5,888 reacted, or 1.5 per cent. The number of herds was 25,058, of which 88.4 per cent were free from tuberculosis. Of the 5,888 reactors, 1,279, or 22 per cent, showed no lesions on slaughter.

The usual explanation of the no-lesion case is that the disease was in the incipient stage, or the lesions were in some obscure part of the body, or that it was of the occult type. It is certain that these are correct for a portion of the no-lesion cases, and we believe it is as certain that they are not correct for all.

It seems probable from our results on skin lesions and from that of Traum on lymphangitis of cattle that infection with some unknown member of the acid-fast group may be responsible for some part of the no-lesion cases. Traum judged that about 50 per cent of the cattle suffering from lymphangitis would react to tuberculin. It may be that the skin lesions are always identical with the disease described by Traum, in which he was able to prove the quite constant presence of acid-fast bacteria by microscopic examination.

We have collected some data indicative of herd infection with some organism which sensitizes to tuberculin. During a period of four and one-half years nineteen reactors were removed from a herd of 65-75 animals. In no instance was evidence of tuberculosis found.

Seventeen animals removed from a herd as a result of three successive tests showed no lesions in ten cases and skin lesions in seven. In still another herd fourteen reactors were found. Slight skin lesions were found in two, and nothing in twelve. From Traum's report we infer that four of the cases of lymphangitis studied by him were from one herd.

If our supposition of sensitization to tuberculin by some other member of the acid-fast group than the tubercle bacillus is correct, it would seem that reactors will continue to be found when all cattle in areas are tested, no matter how long the work may be continued or how carefully the area is protected from reinfection.

It is hoped that others may study the skin lesion and no-lesion cases in order to prove or disprove our supposition, since the future success of area testing may be influenced by such data as we have reported.

PRESIDENT FERNEYHOUGH: We have certainly had a most successful afternoon so far. We are still hoping that Dr. Mayo will come. I suppose he is not with us yet.

We have one more paper, "Preliminary Organization of the Factors Involved in Tuberculosis-Free Areas," by Mr. R. L. Cuff, Representative Live Stock Exchange, Kansas City, Missouri.
PRELIMINARY ORGANIZATION OF THE FACTORS INVOLVED IN TUBERCULOSIS-FREE AREAS.


An old adage states that: "Well begun is half done." This statement is strikingly true in the organization of tuberculosis-free areas. When a county is properly organized for area tuberculosis testing, inspectors can devote their entire time to the testing of cattle instead of debating the value of an area test. In order that work may progress with certainty people in an organized county should know: the facts regarding the transmissiveness of tuberculosis; the number of deaths caused by this disease each year; the percentage of retentions and condemnations in meat producing animals; the actual cost of this loss to producer and consumer and the benefits reasonably to be expected from a modified, accredited area.

In one Kansas county about half of the cattle owners have signed the petition for an area test. The herds of the dairymen and larger cattle owners were tested during the county-wide test without any difficulty because the owners were acquainted with the benefits of the work. But when the inspectors came to inject the one cow herds of the foreign-speaking market gardeners, who were not at the meetings, the owners would say: "What is tuberculosis?" and "Who said my cow was sick?" So, instead of testing 400 head a day these inspectors did well to average 10 head. Area testing is done more quickly and cheaply when cattle owners know in advance the "whys and wherefores of area testing."

An ideal county organization is one in which each of many persons works, for every worker is a booster. Any plan of organization should first engage the active support of all farmers' organizations, of the county bankers' association, of the Chambers of Commerce, of the Woman's Clubs, of the County Boards or County Courts, and of all other interested associations. Experience has shown that a practical method of starting a tuberculosis campaign in a county is to invite officials and representatives of the above named groups to a general meeting and dinner at which time plans are discussed for the testing of this particular county. It is very necessary that all farm organizations be represented at this general gathering, or ill will and a slow campaign will result. At the conclusion of a meeting in a central western county of Kansas no one appeared to favor an area test. When asked what their objections were, the leader said: "If that other farmers' club is for this, we're agin' it." This feeling of antagonism and opposition could have been prevented, had the cattle owners realized that the only two organizations participating in an area test are the individual state and the Bureau of Animal Industry.

It is a good policy to start a county campaign only after the leaders see a glaring need for a modified, accredited area. At least three men from each township of the county should attend the first general meeting. These men can advise where meetings should be held and help
to advertise the community meeting in their own districts. Usually each township wants at least one meeting.

In most instances the County Agents foster organization projects for area testing. The successful termination of a county tuberculosis campaign depends much on the ability of these men; on whether or not they are "sold" to the project; on the manner in which they present information of the test and on the amount of backbone and stick-to-itiveness these men possess and use.

Immediately following the general county meeting is a very opportune time to broadcast educational information regarding area testing and its benefits. Two broadcasting stations in the Kansas City territory have already arranged to broadcast a series of talks on the value of tuberculosis eradication.

Good community meetings are imperative for the efficient culmination of a county campaign. The purpose of these gatherings is to demonstrate to the people that area tuberculosis eradication is a decided financial paying proposition. Until the majority of the people of the country realize the economic loss in owning tuberculous animals, the cattle owners will not sign petitions asking for an area test. Ninetenths of the people who attend tuberculosis meetings go home willing to have their herds tested.

People usually do not become enthusiastic about attending a tuberculosis eradication meeting. In addition to newspaper articles, letters and telephone calls are the best drawings cards for a tuberculosis meeting is the statement that:

1. A local society will serve its regular lunch after the meeting.
2. That the community will stage a short program.
3. That Sam Jones, aspirant to the legislature, will oppose the test.
4. That good motion pictures will be shown.
5. That an interesting talk on the benefits of a modified, accredited area will be given by Tom Smith, the well known live stock sanitarian.

The local chairman of the evening should arrive at the meeting place early enough to insure the building being opened and properly heated and lighted.

At the meeting the attitude and speech of the local leaders should not be: "We want to get 85 per cent of the cattle owners to sign this petition." On the contrary they should say: "You have heard the proposition. If you think this is morally and financially right, get out and work and convert your neighbor, but if you think otherwise, buck it." At the outset each man who is to solicit his school district for signatures should be supplied with a list of cattle owners, as shown by the last tax roll. The petition should be short, legible and concise, and of simple language. At local centers throughout the county maps and charts should be displayed showing the progress of tuberculosis eradication in the United States and in this particular state. Another map should show the separate school districts in this county which have secured the required percentage of signatures, those districts in which petitions are being circulated and those still to be organized.

At the conclusion of local farmers' meetings a good discussion usually follows and brings out points of local interest or questions about
particular happenings of tuberculosis testing in that neighborhood. About a month ago Mr. Treff, a farmer in Wyandotte County, Kansas, stated at a meeting why he was interested in a county test. He stated that his farm was just across the line from Leavenworth County and that his address was actually a town in Leavenworth County. One day an outside buyer came to this particular farm and wanted a carload of heifers. He liked the stock and the price was satisfactory, but decided he would not risk buying them, so he walked across the road and bought a carload from a Leavenworth County man because, as he said, those cattle had a federal health guarantee. A few days later Mr. Treff shipped a carload of hogs to the Kansas City market. The commission firm asked the farmer for his accredited county certificate. Mr. Treff had to tell his commission man that although his postoffice was located in a modified, accredited county, he, himself, lived in another county. He concluded by stating: "Right in one week I lost the sale of a carload of cattle and $17.00 in premium money on my hogs. If Wyandotte County does not become accredited, I am going to move over the line into Leavenworth County.

In selling the idea of area testing to an audience good films are very valuable. Realizing that all farmers never will belong to any one organization, one must be very sure that the films he presents are of general character and not favoring one particular organization. We have found that short, concise meetings are of greater benefit than long drawn technical discussions.

Regardless of definite planning of a county campaign circumstances may prevent some persons from performing their allotted tasks. So, follow up work is essential on the part of the county agent. He should keep all school district solicitors informed on the progress of the campaign. In most cases personal visits to the solicitors help materially in an early return of a well-signed petition.

As in olden times "There was no royal road to geometry," so now the only way to organize a county for area tuberculosis testing is by continuous, intelligent work.

PRESIDENT FERNEYHOUGH: I am sorry to have to report it looks like Dr. Mayo is not going to be with us. I have consistently called for him. I suppose he must be at home. We are very sorry.

The program has been completed so far as the papers are concerned. The entire afternoon's program is open for discussion. The first paper was by Dr. Butler, which he sent in, and read by Dr. Marsh, "The Problems of Tuberculosis Control in Cattle Under Range Conditions." The discussion of that paper is now in order. Has anyone any questions to ask Dr. Marsh? If not, we will pass on to the next paper, "Comparative Lessons in Infection, Detection and Control of Tuberculosis." Has any one any questions to ask Dr. Fox?

That was, to me, one of the most instructive talks we have had for a long time. He brought out his scientific work in a practical way. I heard a gentleman say awhile ago it was a splendid paper. We all, I know, are interested in it.
The next paper was "Bovine Tuberculosis Eradication in Wisconsin from an Administrative Standpoint," by Hon. John D. Jones. Has anyone any questions to ask about that?

Do you know what I think about you gentlemen, now? You remind me of the fellow who sent out notices to the neighbors that his son was coming in to preach. They all wanted to hear John. John took his text. He said, "And Peter's wife's mother lies sick of the fever." He didn't preach a very good sermon. He was going to preach in the morning and in the evening, so he invited them all to the evening services.

John took the same text, "And Peter's wife's mother lies sick of the fever." They invited him to preach the next day and he took the same text.

This was before prohibition. One old brother said, "Say, John, ain't that damn old woman dead yet?" (Laughter.)

I reckon you just died.

What about the last paper by R. L. Cuff?

DR. J. A. KIERNAN: No lesion cases in reactors, of course, is a matter that concerns us all. Last year, the fiscal year, there were 171,481 reactors found in the 5,432,000 cattle tuberculin tested. The post mortem results on those 171,000 reactors showed no visible lesions, or 8.4 per cent. Of the specimens sent to the laboratory in Washington, as Dr. Beach said, 20 per cent showed acid-fast organism, having the form and shape and variety of the tubercle bacilli.

The percentage of no-lesion cases varies in the different states. Dr. Beach stated what it was in Wisconsin. In the state of New Jersey during that same period there were 4,027 reactors destroyed and one-half of one per cent no-lesion cases. Why there should be a variation in the different states, we don't know. Of course, we want to find out and we commend the work that Dr. Beach and Dr. Hastings are doing and want to see more of it done.

If there is a way to account for the no-lesion cases, of course, that is what everybody wants to find out.

Seven years ago when we met in this room, we adopted the uniform accredited herd plan. We didn't have perfect methods then. Nobody believed that the plan under which we were to operate was without imperfections. Within that period of seven years the work has been extended to every state. Today out in the field, not here, they are tuberculin testing probably 50,000 cows.

Last year there were tested a total of over 5,000,000 cattle. There are upwards of 10,000,000 cattle under supervision in the United States today. The 500 men that are working are testing cattle on the area basis, in over 400 counties in the United States today, and I think we have reason to feel quite proud of the great work which has been accomplished. It is not to the individual efforts of the state or federal officials who are in the office directing the work I want to refer, but to those men, some of them plowing through the snow in some of the states, who are injecting the cattle. They are the one who are spreading this propaganda. They are the ones that are giving the information to the farmers, showing them the possibilities of this work, and
they are the ones that are building up the sentiment all over this country which makes for the campaign we believe will result ultimately in the total eradication of the disease among cattle. I want to pay that tribute to the men out there doing that work. They are the ones who are getting the results, and I want to say, of all the great work that is being done by those men, they certainly must be working harmoniously with the owners. They certainly must be rendering good service. They certainly must be showing them they are interested in the work and what interests them is not only the cow they are injecting but the baby on the farm and the baby in the city, and I pay that tribute to those men who are out there testing the cattle in the field today.

(Applause.)

MR. JONES: Unless there be some misapprehension and some misunderstanding concerning the question of no-lesion cases in Wisconsin, I believe Dr. Beach cited a case of one county in which more than fifty per cent of the reactors displayed no lesions.

DR. BEACH: That is what I was told.

MR. JONES: I might point out Florence is not a typical county of the state. It is located in the extreme northern part of the state. Its cow population is less than 3,000 and the total number of reactors taken out was less than twenty-five, so that the results are not at all typical of the general situation; for the reason the data might be misconstrued, we have purposely avoided publishing the results of the study of the testing work in other counties so far as lesion and no-lesion cases are concerned. But I might suggest that the range is from approximately ten to twenty-five per cent, which is the highest, I believe, of no-lesion cases we have had in any of the counties thus far.

PRESIDENT FERNEYHOUGH: I have had some experience of tuberculosis in Virginia and those no-lesion cases interest me, too. When I heard him say fifty per cent I commenced to wonder, and I thought somebody else would pop the question. I was very much impressed by what Dr. Kiernan said.

DR. NORGARD (N. Y.): I don't believe, Mr. Chairman, we have so great a cause for apprehension in the matter of no-lesion cases when we consider the exceedingly large field of the smaller percentage of tuberculosis which we have in great areas in the part of the country we have been testing. I think it is remarkable we have so small a percentage of no-lesion cases.

I think when we get down into the areas which are more highly infected, the percentage of no-lesion cases will be even smaller. In the state of New York the records show we have taken out practically 98,000 reactors, and of those reactors less than ninety per cent have been no-lesion cases, and sixty-two per cent of those no-lesion cases appeared in the animals from infected herds. I think we certainly have to look upon this piece of work all over the United States as a piece of work that is tremendous in its scope.

We have had to develop the evidences supporting the tests we are using, to develop the detail of handling them, while we have been going on. Yet, in spite of that fact, the small average per cent of no-lesion cases we have had, it seems to me, is remarkable, when we remember
also that in many other places where the examinations have been made
(the examination is not a real post mortem but an examination as to
whether or not the animals are fit for meat) I don't believe we ought to
really consider these examinations as absolute post mortem, when they
are not post mortem, and try to check ourselves so close. I think we
ought to try to improve the post mortems and get them where they
are as near as possible to real post mortems rather than an examination
of the meat. So I think we can congratulate ourselves, at this stage of
the game, that we have made pretty satisfactory and safe progress.
With the evidence we have on hand at the present time of where the
weak points are, I believe we can go ahead with pretty fair assurance
this no-lesion scare is not going to be anything serious and fundamentally
serious to the good work which we are doing.

DR. BEACH: I object a little bit to Mr. Norgard's statement of
the no-lesion scare. It seems to me it is an exceedingly good thing to
put all of the evidence on the table, that we can get. The incidence
of no-lesion case is absolutely no argument against the tuberculin test.
The tuberculin test is the only thing we have for eradications, and when
we start to compromise with the test we are lost, and there isn't any
question about that.

Some of the farmers think (I know because they told me so) when
they get the cows tested once or twice there won't be any more reactors.
Just why they have that idea I don't know, but it seems if they could
be told there probably always will be some reactors regardless of the
tuberculosis infection, that we may have less hedging to do at some
future time.

It has been pointed out that in some areas in the United States
no-lesion cases are very, very small, and in other places they are ex-
ceedingly high, running on an average, I believe, as Mr. Jones has
pointed out, from ten to twenty-five per cent or from eighteen to
twenty-two per cent. I don't remember what the figures were, but it
was in there somewhere. Not all of the no-lesion cases can be said
to be non-tuberculous. That is no doubt whatsoever. I didn't want
it to appear as though we were trying to throw a scare. We see those,
and if they are facts they should be on the table.

DR. NORGARD: I wouldn't want Dr. Beach or anybody else to
think the study was a scare or anything undesirable. I think we should
encourage that kind of a study. We want to know the facts. We
aren't afraid of facts. If the facts indicate our study is wrong then
we want to know them and correct them on the basis of facts. I would
want to encourage the kind of investigation Dr. Beach has done and all
investigations that give us light on any of the important phases of
the work, especially this no-lesion phase.

PRESIDENT FERNEYHOUGH: I just wish to say I am very
much interested in what all of the gentlemen have to say on the subject,
but I, myself, must say I reckon I am extra timid. If you hadn't modi-
fied your statement you would have scared me a little bit. I must ad-
mit you are a pretty brave man when fifty per cent doesn't scare you,
and I am very glad the question has been put up before the Association.
I feel very grateful to the commissioner and to you also because I will
tell you if we had gone off from here leaving the impression that Wisconsin had fifty per cent no-lesion reactors, it would have been hard to explain, and I am very thankful it has been explained.

MR. A. J. DeFOSSET: On this no-lesion case, we had a little experience at Columbus, Ohio, with a test that was made there about a year ago. I think there were something like eighteen or twenty reactors found, and they began slaughtering the reactors. After the slaughter of four or five they couldn't find lesions so they considered the others suspects and put them back in the barn adjacent to the main herd. They were left there about six months. The attendant who took care of the suspects also took care of the main herd. There was an alley run between the herds where the attendants could go back and forth, and there was a considerable possibility of carrying infection from one herd to another. When the retest was made in six months of the entire herd, including the fifteen suspects which were left when they got cold feet in slaughtering the four or five head, they all reacted, and in a herd of 105 eighty-five animals reacted. It was a very fine, pure bred Jersey herd, and one of the finest herds in the state of Ohio, I believe. That is a pretty sad experience with no-lesion cases. I believe had they gone a little bit farther and killed a few more they wouldn't have met with the sad experience in that particular herd.

PRESIDENT FERNEYHOUGH: I quite agree with you. I think we all can very well recollect what Norgard had to say on the subject. He says, I believe, where there is a true reaction the animal is tuberculous. It is invaluable. I believe him and I am very glad this discussion has been borne out, and I will be very glad to hear from anybody else.

I am sure no one wants to deceive, but I tell you, gentlemen, the last speaker brought out a point which is very valuable. It is a very serious thing to make any statement that will cause especially laymen to think no-lesion cases mean no tuberculosis. That is nonsense. A true reacting animal is tuberculous, if we believe it. If we don't believe it we are a pretty dishonest crowd. If we do believe it we ought to stand by it.

MR. DeFOSSET: It has been my observation that co-operation of the owner is very essential in ridding the individual herd of tuberculosis, and I would like to inquire of Commissioner Jones of Wisconsin what his experience has been in regard to the attitude of testing the cattle of a hostile owner.

MR. JONES: I would suggest at this time that problem is not so large a problem as it was five years ago. Public sentiment is rapidly developing favorably to the application of the test.

I would say, however, in some minor instances, in these various counties where we are working, there are owners who object. Under the state law, however, the department is given ample authority to arbitrarily enter the premises and examine the cattle to test them for tuberculosis, and the Attorney-General's department has ruled that we cannot only examine and test the cattle but we can take such further steps as are necessary to safeguard the live stock health of the community, which means, of course, if in the judgment of the department it is advisable to remove the reactors we have authority to do so. It is interesting in this connection to state in those seven counties tested in
the last fiscal year, I believe, there is only one herd owner from whose premises reactors haven't been removed, and in that case they have been quarantined in such a way as to safeguard the health of the adjacent herds. If the quarantine is violated, doubtless the court will give an order authorizing the proper public officials to remove the animals. That is not an immediate problem in Wisconsin at this time.

DR. CONNAWAY: In this discussion of no-lesion cases the thought came to me, as it probably did to men like Dr. Van Es, that we may have an infection here in these non-lesion cases that is not bovine infection. The pictures which Dr. Fox put on the screen showed you there was a difference in the histopathology of the different animals, and I think it is possible in these cases of non-lesion animals which have reacted we may have the avian type of tuberculosis. That is a problem which has not been investigated in the bovine species. It seems to me here is a field we might investigate and might clear up this matter. That is all I wanted to say on that, but I did want to ask Dr. Van Es a question in regard to one of his charts.

PRESIDENT FERNEYHOUGH: I somewhat overlooked Dr. Van Es's paper, but it is up for discussion.

DR. CONNAWAY: I intended to tell you that you had overlooked it. There is no need to commend the work Dr. Van Es has done. It shows for itself, but it illustrates, it seems to me, the value of bringing men like Dr. Van Es into associations like this and presenting papers of a scientific nature, and it is up to you men to make the practical applications. Sometimes, men who are not accustomed to thinking of these things scientifically go away with a wrong impression of what has been presented, just as you mentioned about certain statements made here. The important thing is not to carry away a wrong impression.

I dare say some of you men think there is an inter-communicability on both avian and porcine tuberculosis, but this, apparently from the investigations that have been made, is not the case. The man who has chickens need have no fear at all, or I think scarcely any fear of infecting his flock from tuberculosis in cattle and in swine.

About twenty years ago I tested out that matter in a case of bovine-porcine tuberculosis, by which term I mean an experimental case of the transmission of the bovine type into hogs, and then the feeding of a viscera of those hogs to chickens in massive quantities, and we got no tuberculosis in those chickens. We couldn't at that time do the reverse operation because in Missouri we had no chicken tuberculosis, or at least, I think we did not have at that time. Materials coming into our laboratory indicated our state was free from that disease.

But later, after the work of Dr. Van Es up near Canada, we began to look for these things more and more, and in the last few years it has appeared in our state I think through the shipment of infected fowls, and not through any eggs. We also find in the twenty-one counties now infected, all but five lie north of the Missouri River. The southern part of the state is practically free.

Dr. Erickson, the pathologist at the state poultry station in the southern part of our state, has told me he has not seen any avian tuberculosis in that part of the state. So it looks to me as though we
have a practical problem and we have to get the co-operation of the chicken men in order to make practical progress, because, as Dr. Van Es has shown us in his splendid work, there is a real danger to the spread of tuberculosis among swine. As I have indicated, there is a possibility we may yet find there is some danger of transmitting that to the bovines, and the possibility that these non-reactors may be due to this avian type.

The question I wanted to ask you, Doctor, was this: In this mixed type, I think I heard you in another meeting mention in your opinion there was a transitional type, but did you mean by this that you had the bovine type and the avian type and we might separate those into two distinct types, by running them through the different animals?

DR. VAN ES: We gave them the term for the sake of convenience. Those types of tuberculosis may be due to the simultaneous presence of mammalian and avian, or due to the presence of types of bacilli which are virulent which will cause disease in the guinea pig in this case and also in the bird. It is not a clear cut classification of anything. I cannot conceive that we have really three types of tubercle bacilli in our domestic animals or in man which you can clearly separate by a distinct wall or partition. In the transitional type there are forms which cause disease on both sides. If we have such forms then it would be difficult by the use of guinea pigs and fowls to separate them, while, on the other hand, if we have the presence of mammalian and avian bacilli coming from different organs, then it would be a comparatively easy matter to separate the sheep from the goats.

DR. CONNAWAY: I wish to recall, too, maybe three or four sessions back, Dr. Day, the pathologist of the bureau located here, reported cases of the avian type in swine and a good many of us thought he was very well founded in his suppositions. I just want to recall that just for historical purposes and connect up this work which is a continuous process from man to man as time goes on.

The meeting adjourned at five o'clock.

Adjournment.

FRIDAY MORNING SESSION.

December 5, 1924.

The meeting was called to order at 9:15 o'clock.

PRESIDENT FERNEYHOUGH: I have a letter from Dr. Munce, Chairman of the Policy Committee. He tells me he cannot be here and that Drs. Bruner and Jacob will represent him. We will hear from Dr. Jacob on the Policy Committee.

DR. M. JACOB: Mr. Chairman and Gentlemen: I don't feel capable of representing Dr. Munce, but I believe I do have in mind what he wishes to be done.

As the Chairman has stated, Dr. Munce is Chairman of the Policy Committee and this Committee has been working during the past year in order to arrive at something definite regarding the real purpose and scope of this organization. It has been, in times past, somewhat of a
question as to whether or not the Association was working in exactly
the right line. In other words there has been, in some instances, some-
what of a conflict with the work done by this organization and others,
more or less of a duplication, and it is felt that this organization has a
distinct field and a distinct purpose.

While the Committee has been at work during the past year all
that can be reported at this time is progress, and the Chairman sug-
gests in order to be able to accomplish during the next year what it is
intended to do that the scope of the work of the Committee be broadened
and that it include a revision of the Constitution and By-laws. It is
necessary to have that privilege in order to be able to accomplish just
exactly what the Committee desires.

That is the recommendation of the Committee, and I move that it
be adopted.

(The motion was regularly seconded and unanimously carried.)

PRESIDENT FERNEYHOUGH: We will now have the report from
the Committee on Tuberculosis. Dr. Jacob is Chairman of said Com-
mittee.

(Dr. Jacob read his report.)

REPORT OF COMMITTEE ON TUBERCULOSIS.

During the last annual meeting of this association a resolution was
adopted which requires that all requests or recommendations for modifi-
cation of the Uniform Accredited Herd Plan be submitted in writing
to the Chairman of the Committee on Tuberculosis not later than sixty
days before the annual meeting. This I am pleased to report has simpli-
fied its work very materially, giving to the Committee, as was originally
intended, more time for the study and solution of its problems.

In order that there may be no misunderstanding it is recommended
by the Committee that the past year's plan of submitting requests for
modification in writing not less than sixty days before the annual meet-
ing be made the permanent policy of this Association.

One of the first things undertaken was the rearrangement of the
articles included in the present form of agreement in order to more
clearly set forth its provisions to the reader. This should greatly sim-
plify its use.

Urgent requests have come for a Modified Accredited Area plan,
especially applicable to the Western range section. The Committee has
already given this subject a great deal of study, and has a sympathetic
appreciation of the problems with which those of the range section are
confronted. It is felt, however, that more time will be needed for a so-
lution of this important problem, consequently definite action in the
matter has been deferred for one year.
UNIFORM METHODS AND RULES FOR THE ESTABLISHMENT
AND MAINTENANCE OF TUBERCULOSIS-FREE AC-
CREDITED HERDS OF CATTLE.

Unanimously adopted by the United States Live Stock Association; and
by Representatives of Pure Bred Breeders' Association; (date) and
approved by the United States Bureau of Animal
Industry. (Date.)

Part 1.

Individual Accredited Herd Plan.

1. A tuberculosis-free accredited herd is one in which the entire
herd has passed two successive annual or three semi-annual successive
physical examinations and tuberculin tests, and the herd maintained un-
der sanitary conditions.

(a) Each tuberculin test and physical examination are re-
quired to be applied by a veterinarian regularly employed by the
U. S. Bureau of Animal Industry, or
(b) By a veterinarian regularly employed, or accredited and
commissioned by the state, or
(c) By a veterinarian as qualified according to Paragraph 13.

2. The tuberculin test.

(a) The subcutaneous test or the intradermic test may be
used singly as an official test.
(b) The ophthalmic test will not be accepted as an official
test except when applied in combination with either the subcutaneous
or intradermic test.
(c) A herd in which reactors have been found by a preceding
test shall not be accredited except when the final or accrediting
test has been made by a combination of either the subcutaneous and
ophthalmic test or by a combination of the intradermic and
ophthalmic test.

3. The entire herd, or any cattle in the herd, shall be tuberculin
tested or retested at such times as deemed advisable by the co-operating
Federal and State authorities.

4. No animal shall be presented for the tuberculin test which has
been designated as a reactor at any time.

5. Reactors to any test are required to be immediately removed
from the farm.

6. After removal of reactors, the premises shall be thoroughly
cleaned and disinfected.

7. Herd owners are required to house, feed and care for the
cattle under such sanitary conditions as will tend to promote good
health, and to allow such recommendations made by the co-operating
Federal and State authorities.

8. Calves shall not be fed milk or other dairy products except
when such milk or other dairy products have been produced by a herd
that is under the plan: Or when the milk or other dairy products from
outside or unknown sources shall have been pasteurized by heating to 145 degrees for thirty minutes.

   (a) The herd owner is required to establish satisfactory evidence of the identity of each registered or grade animal. The grade animal to be marked by a tag or other marking satisfactory to the co-operating Federal and State authorities.
   (b) Each herd owner is required to keep a record of all removals of cattle from the herd by sale, death or slaughter.

10. All vehicles are required to be cleaned and disinfected before they shall be used for the transporting of cattle to herds maintained under this plan.

11. Added Cattle.
   (a) Cattle may be added to an accredited herd in accordance with the following provisions:
       Originating from an accredited herd. From a once tested free herd on one additional test applied in from 60-90 days and during such period shall be kept separate from the herd.
       From modified accredited areas and subsequent retest to be applied in from 60-90 days and during such period shall be kept separate from the herd.
       From a herd not under supervision which has passed one complete herd test by an approved veterinarian and subsequent retest to be applied in from 60-90 days and during such period shall be kept separate from the herd.
   (b) Cattle may be added to once tested free herds in accordance with the following provisions:
       From accredited herds, once tested free herds or modified accredited areas, without further test.
       From a herd not under supervision which has passed one complete test by an approved veterinarian and a subsequent retest to be applied in from 60-90 days and during such period must be kept separate from the herd.
   (c) Cattle added to other herds under this plan, unless complying with the provisions of paragraph A or B, shall pass two (2) official tuberculin tests applied at an interval of from 60-90 days, and during such period shall be kept separate from the herd.

12. The cattle shall not be bred except when such cattle are being maintained under this plan.

13. After a herd is accredited by a co-operating Federal and state authorities, it shall revert back to the owner to be retested annually at the owner's expense by an accredited veterinarian, providing the following regulations are observed:
   (a) When a herd has been officially accredited by the United States Department of Agriculture and state, it shall be, when ordered by the live stock sanitary officials of the State, tuberculin tested annually by any veterinarian whose name is upon the accredited list of veterinarians approved of by the United States Bureau of Animal Industry, provided that before any veterinarian other than one who devotes his entire time to the work of any
state or the Bureau of Animal Industry can be approved for accredited herd work, he shall have passed an examination conducted by the proper live stock sanitary officials of the state in which he resides and the Bureau of Animal Industry. He then shall be obliged to conduct annual tuberculin tests upon herds which have been officially accredited upon dates approved by the proper state live stock sanitary official and the instructor in charge of the Bureau of Animal Industry in the state wherein the herd is located.

(b) The accredited veterinarian selected by the owner shall not conduct a test under the plan until after he shall have received authorization in writing from the directing state live stock sanitary officials.

(c) The co-operating Federal or state officials reserve the right to supervise any test conducted by an accredited veterinarian.

(d) The accredited veterinarian shall apply the test and submit a report of the results of test in accordance with the regulations of the co-operating Federal and state authorities.

(e) Accredited veterinarians, after proper authorization in writing from the proper state officials, may conduct tuberculin tests at the owner's expense on herds in the process of accreditation, until the entire test has passed one negative test; provided, however, that in such herds Federal indemnity shall be payable only in accordance with the regulations of the U. S. Department of Agriculture, which provides that when 15 per cent of the total federal indemnity allocated to each state is not sufficient to meet the demands in a given state, then an additional amount of state allotment shall be used, provided funds remain available. After herds are credited with passing one test, the final or accrediting test is required to be conducted by a veterinarian in accordance with paragraph 1, sections A and B.

14. If the retest of an accredited herd discloses not more than one reactor the herd may be reinstated, provided: That the entire herd shall pass another retest which shall be made not less than four months from the date of the previous test.

15. If, as the result of the retest of an accredited herd, more than one reactor is found, another retest may be applied to the entire herd 60 days from the date of last test. Such retest may be applied by an accredited veterinarian, according to section 13, or by a regularly employed veterinarian, in accordance with paragraph 1, sections A and B.

16. An accredited herd certificate shall be valid for one year, and shall be issued by the co-operating Federal and state authorities.

17. Cattle from an accredited herd may be moved interstate on a certificate of health and tuberculin test chart, which will be issued by the co-operating Federal or state officials.

18. Failure on the part of an owner to comply with the intent of these methods and rules shall be considered sufficient cause for the cancellation of the agreement.
Part II.
Modified Accredited Area Plan.

19. The provisions of the Individual Accredited Herd Plan that relates to testing, removal of reactors, cleaning, disinfecting and sanitation shall apply to the Modified Accredited Area Plan.

20. The extent of the area shall be determined by the Federal and state authorities in agreement with the co-operating agencies within the area.

21. When the testing is started the area shall be placed under quarantine and the following rules and regulations shall be effective:

Regulation 1. No cattle shall be imported, or brought in, or allowed to enter the quarantined area; except in accordance with the following rules:

Rule 1. Cattle that have passed an official tuberculin test.

Rule 2. Cattle for immediate slaughter may enter the quarantined area, to be slaughtered within ten days of such entry, and during this ten days' interval they must be kept separate from other cattle.

Rule 3. Steers and female cattle of beef breed branded F on right jaw may enter the quarantined area for feeding purposes under special quarantine and confined separate from other cattle on the promise of the owner or on such other promise as may be designated in the order of special quarantine.

Rule 4. All cattle, other than those described in Rules 1, 2 and 3, must be subjected to an official tuberculin test before entering the above described quarantined area.

22. If, as the result of one complete tuberculin test within the designated area, the total number of reactors is less than half of one per cent of all the cattle within the area, the area shall then be declared an Official Modified Tuberculosis-Free Accredited Area for a period of three years by the co-operating Federal and state authorities, provided:

(a) That individual quarantine shall be established on the infected herds.

(b) The quarantined herds shall not be retested within 60 days from date of last test, subsequent tests to those herds to be determined by the co-operating Federal and state authorities.

23. If, as the result of one complete tuberculin test of all cattle in the area the total number of reactors exceeds half of one per cent and less than one per cent then the infected herds shall be quarantined and retested and if as the result of this retest the entire number of reactors within the area shall be less than half of one per cent of the entire number of cattle within the area, the area shall then be declared an Official Modified Accredited Area.

24. If, as the result of one complete tuberculin test of all the cattle within the area, the total number of reactors equals or exceeds one per cent (1%), then all cattle in the area shall be retested.

J. A. KIERNAN, W. F. CREWE,
S. E. BRUNER, M. JACOB, Chairman.
DR. JACOB: There have been certain definite changes made in the uniform accredited herd plan and I will pick out those changes and submit them to you for adoption. Paragraph 3 becomes paragraph 4 under the revised form. Paragraph 5 becomes paragraph 11. Sections A, B and C of paragraph 4 become paragraph 21 under the modified accredited area plan.

Mr. Chairman, I move the adoption of these recommendations.

(The motion was regularly seconded.)

PRESIDENT FERNEYHOUGH: You all recognize the fact it is important for us to have official rules. We cannot work without rules, and I think the committee has gone over it and worked as carefully as any body of men could be expected to do.

DR. LAMB: In relation to the matter submitted by the committee relative to the request for modification of the regulation from the range states, perhaps the association generally, as well as the committee in particular, should be made somewhat more familiar than they are with the conditions as they exist in range states, and the reason for the range states having asked for some particular modification. These modifications are asked by an association that has recently been formed, known as the Western States Sanitary Association, consisting of seventeen western states.

While I am not authorized to speak officially for this association at this particular time, still I think it well to present to the Association, as a whole, the reasons for our asking for these modifications. In all of these range states there are counties or localities, more or less extensive, in which there are at least two separate and distinct classes of cattle. One of these classes is what we term a range animal. The other is a class consisting of dairy cattle and pure-bred cattle.

Now, it is very conceivable that in many of these localities a number, more or less large, of men may be engaged and are engaged in the raising and maintenance of pure-bred herds. There are also a number of others engaged in dairying and have a regular dairy bunch of cattle of the dairy breed. At the same time in that particular locality there are other men not interested especially in pure breeds or in dairy cattle, but are interested and run large numbers of range cattle. These men engaged in the dairy business and engaged in the pure-bred business are just as much interested, or getting to be just as much interested, in the establishment of pure-bred accredited herds as men in Iowa or Ohio, or any other eastern state. They feel, and we feel with them, that some arrangement should be made whereby these men may have the same advantages as men engaged in the same business in other localities do have, in spite of the fact these pure-bred and dairy cattle may be a comparatively small proportion of the entire number of cattle in the county or area in question.

We have felt, and still feel if we can demonstrate to this association or the Tuberculosis Committee that our range cattle are free or approximately free from tuberculosis, what we propose to this committee to do is test in a given locality or given county all of the dairy cattle, all of the pure-bred bulls of every breed and pure-bred female breeding cattle, and we contend if the bulls and the breeding females
are free from tuberculosis that their progeny may be accepted as free from tuberculosis. We do not feel at the present time that it is feasible or practical, although it might be done to test all of these range cattle. It is a physical impossibility. They are just as wild as the antelopes or bob cats or any other wild animals. While we might test them we would meet with the most strenuous opposition from the cattle owner who objects to handling these wild range cattle. It would be necessary even from the intradermal test to handle them twice. As I say, it would be a stupendous job and we would meet with very great opposition.

But we do feel, gentlemen, these men who are running pure-bred dairy cattle and are anxious to get in under this arrangement which men in other states enjoy, should be granted that privilege. Voicing the sentiment of seventeen western states, I give you warning now that this matter will again be presented to your Tuberculosis Committee and presented perhaps more strenuously than it has been presented this time, and it will continue to be presented to your Tuberculosis Committee until we get what we think we are entitled to. I thank you.

DR. W. GILTNER: Paragraph 21 states female cattle in addition to steer, if branded, are to be permitted to enter a dairy under quarantine. Is that correct? If not, so far as the state of Michigan is concerned, I desire to voice an objection to that ruling. I believe I can safely say in so far as we are concerned in our work we will not permit female cattle, untested, to enter an area under quarantine. I appreciate the fact we can do that in spite of the ruling of this association or the bureau, but in making effective such a ruling you are undermining our situation. Who is going to tell, in a good many instances, if they are beef breed or dairy breed? I can't do it. What does the brand amount to on an animal in the feed lot for several months?

DR. JACOB: This clause states "may." It is your prerogative to do whatever you want to.

DR. GILTNER: A man using a lever on us will cite the ruling of this association and probably the approval of the bureau.

PRESIDENT FERNEYHOUGH: I think it is understood that this is a suggestion passed by the association. Of course, any of the states who cannot comply don't have to. (The motion was carried.)

PRESIDENT FERNEYHOUGH: Are there any more committee reports? If not, our regular program this morning is in order. I have a letter from Dr. Stange saying he cannot be with us this morning, and I was going to place Dr. Mohler in Dr. Stange's place, if he was present. The rest of the program deals with the subject of hog cholera and it will be continuous, so I thought we had better have Dr. Mohler on next.

Dr. Van Es has just informed me, owing to the absence of Dr. Stange there will be no report from the Committee on Hog Cholera.

There is also a letter here in the form of a report, on Tick Eradication, submitted by Dr. Bahnsen, who had to leave. The whole committee signed it. I think if it meets with the approval of the assembly we will just turn the report over and let it go in the annual report.
If that is entirely satisfactory to the assembly I wish someone would make a motion to that effect.

DR. JACOB: I move that that report be accepted.

(The motion was regularly seconded and unanimously carried.)

PRESIDET FERNEYOUGH: Dr. Turner will not be with us.

Gentlemen, I wish to say for the benefit of this assembly something happened yesterday which I am sure we are all very sorry for, but I can't see how the association can possibly be held responsible. With all of my calling yesterday afternoon Dr. Mayo was in the lobby all the afternoon. No one knew it. We didn't have any way of knowing he was there. I met him yesterday evening about 8 o'clock. It seems he came in the lobby about 2 o'clock, but he did not make himself known, and we had no way of knowing he was there. For some reason he didn't communicate with anyone and no one knew he was here. He said he would send in his paper to go in the report. I told him, of course, we would be glad to have the paper.
PRESIDENT FERNLEYHOUGH: I am going to take advantage of this opportunity to thank you gentlemen for your splendid support to me as presiding officer during this session. You have made it not only possible for everything to move smoothly but it has really been a pleasure. The attendance has been good and everybody has been quiet, and the attention has been splendid.

Occasionally I have to go before the Legislature in Virginia, and when I see the Speaker of the House and the President of the Senate rapping and calling for order and asking them to stop the fuss in the gallery and all that going on all of the time, I thought yesterday I would like some of those legislators to come here and learn how a lot of gentlemen ought to behave. (Laughter.)

We are going to have a speaker on here, pretty soon, from Nebraska. He is a good man. We have had two from Nebraska, but God knows we had a Charley horse from Nebraska on the Democrat ticket this year. (Laughter.) I am a Democrat from down in Virginia and I was conscious of the fact we really had a Charley horse, but I am glad that that has all been atoned by sending such men as Dr. Van Es and Dr. Hayes who is going to address us later on.

One time I visited an asylum. I wasn't sent there. I was only visiting. I noticed some of the fellows were pushing wheelbarrows. One fellow kept on rolling the wheelbarrow. He had an empty wheelbarrow. The other patients were rolling wheelbarrows full of brick. They were trusties and were getting so they would soon go home. I was determined to find out why that fellow was pushing an empty wheelbarrow. I said, "Look here, Cap, would you mind telling me why you roll the wheelbarrow upside down, while the other fellows are all rolling brick?"

He said, "That is easy. As a matter of fact, this is for crazy people. There isn't any of us getting a damn thing for this work, and those damn fellows are all breaking their necks pushing the wheelbarrows full of brick." (Laughter.)

It just shows you, gentlemen, what you can do. Supposing a little, simple horse doctor had been put on the program and went across the United States to attend a national meeting and then sat in the lobby all the afternoon and didn't let anybody know he was there. I swear they would have locked him up, but if you are a smart man you can get away with it. (Laughter.)

Dr. Hayes, I want you to get on your subject.

We will hear from Dr. Hayes from Nebraska on "The Value and Application of Sanitary Measures in the Control of Swine Diseases."
THE VALUE AND APPLICATION OF SANITARY MEASURES IN THE CONTROL OF SWINE DISEASES.

By Dr. C. H. Hays, Lincoln, Nebraska.

Sanitation as a measure in protecting the nation's live stock industry has long been used, but sanitation as the fundamental base upon which a herd or flock management is built is a new adventure, and a radical change in accustomed practices. So radical, it may be stated, that no longer than a year ago from the floor of this assembly ridicule and jest were directed at the plan of live stock sanitation, it is our purpose to discuss under the caption assigned for this paper. Possibly repetition, and time had for mature thought regarding the program of sanitation propounded may change those given to unfavorable censor a year ago and they may now be found as supporters.

Application of sanitary measures is fundamental in the protection against losses among live stock, the value is known. However, in all the past where sanitation has been applied, the attack has been directed under legalized policing authority at the epizootic or enzootic appearance of some specific disease. Too frequently the live stock owner has not been in sympathy with the effort being made in his behalf, nor has he been convinced of the value, at least the practical value, of the measures pursued. It has been most often that the sanitarian and his co-workers have been viewed as an imposition rather than an asset to the industry. The dispenser of pills, capsules, or syringe potions—in other words, anything having the semblance of specific animal treatment, either for prevention or cure, has incited more confidence and satisfaction than theoretical and questioned practical herd sanitation.

The idea of herd sanitation is not new. However, the usual measures outlined or suggested have been at variance with reasonable practicability and next to impossible of application. When recommended, the plan has either been confused with or held secondary to the sale or distribution of some so-called specific treatment on which, if any results have been obtained, falls the credit for the results which may have come from even careless and indifferent attempts at sanitation.

In this discussion, we do not lose sight of the heroic work of our live stock sanitarian who has been engaged in combatting such plagues as contagious pleuro-pneumonia, foot and mouth disease, Texas fever, etc. His instrument has been sanitation, direct or indirect, but as has been stated, this has been applied under legalized policing authority. For the reason that such bodies as this Association have lent power and influence which have aided in the successes of the live stock sanitarian in these endeavors, it is believed a similar support in the proposed program will have an equally valuable effect for success of the project. To that end I willingly add my bit by telling this Association of some of our observations and activities in Nebraska, where we have seen adopted the plan of live stock sanitation first described by Dr. B. H. Ransom as the "McLain County System" for the prevention of the parasite ascaris lumbracoideus among swine.
The McLain County System has been repeatedly described as to
detail and therefore need not be considered from that angle at any
length. The system should be familiar to everyone having to deal
directly or indirectly with the producing swine industry. Dr. Ransom
has outlined the plan in a bureau circular which is available from the De-
partment for the asking. Briefly outlined, the plan requires a clean
farrowing place for the sow which is properly cleaned before being
placed in the clean pen to farrow. When the pigs arrive they are not
permitted access to any of the old hog lots but are transferred in due
time to pastures which have not been used for swine since cultivation.

The principle involved is to keep the readily susceptible pigs from
places harboring worm eggs and other infections, at least until they
are of an age when less susceptible or more able to resist the infections.
The question has been raised since the adoption of this system by certain
producers as to whether a pig ever grows to an age, or degree of re-
sistance when it will prove profitable to unduly expose that pig to the
filthy hog lot of the past. One investigator very forcibly puts the ques-
tion in every day language when he states that it is as reasonable to
wash the plate of the human family in sewerage as it is to expect to
raise our pigs on a dinner plate built from the filth of their ancestors.

It is appreciated how such a system as proposed may draw the fire
of ridicule when first described to those accustomed to seeing the pig in
his usual cornbelt or wilder habitat. The filthy, long-used hog lot has
been held above reproach by the producer, and where any attempt at
sanitation has been made, it has been to mend the old hog lot and not
abandon it. Expensive equipment has been built on the shore line of
these cesspools of danger, but always the old hog lot has been perpetu-
ated and provided that it could become a greater rather than a lesser
danger. A way has always been made that these lots are not only
accessible, but that the pigs are forced to come continuously in contact
with their menacing dangers.

The adoption of the McLain County System has demonstrated as
facts some of the dangers we have suspicioned our long-used, filthy lots
contained. The assorted group of diseases or diseased conditions have
not been separately nor specifically described, but it will suffice for our
purpose to place them under a single heading and term them filth-born
diseases or conditions. Our observation has been that the group may be
subdivided into two classes: First, those diseases that affect the ex-
ternal body; and second, those that affect the internal body of the
animal. Certain of these have been descriptively named and though not
specifically proven in keeping with the accepted measure for a specific
disease, can be recognized as to their infectiveness and danger. In the
group we have bullnose, necrotic rhinitis, sore mouth of pig, dermititis
of various types, including scabies infection, pneumonia, including ver-
minous, and infectious enteritis or pig typhoid. These are enumerated
that we may glance at the broad field to attack when we advance the
value of the McLain County System in preventing these diseases among
swine.

The damage from this group of diseases, including the ascaris para-
site, has continuously increased to the point on many farms where swine
production under the usual practice has become a practical impossibility. It is a no uncommon situation to find losses among pigs in early life so great as to force many producer-feeders to look to other fields for pigs to be fed in their lots. These losses, while probably most disastrous to the larger producers, are evident on the general farm, and a certain toll is exacted by the ravages of these diseases. This aggregate loss must be reckoned with in considering profitable swine production, and being preventable if we as sanitarians are to serve the swine industry in proportion to the service we render to other parts of the live stock industry, we are not properly safeguarding to be heedless of the opportunity which is ours through securing the adoption of this system more generally in swine raising.

When this plan was first described, we in Nebraska who are in contact with the problems of our swine producers, made preparations to have demonstrated the McLain County System among our swine growers. Our field was well stocked with suitable places for demonstrations; the results have been satisfactory, even more than we believed they would be. We could cite instance after instance, from all parts of our state under a motley of conditions, where the plan has proven its worth and practicability. There are places where in recent years it has been impossible to raise pigs, where the grown crops of hogs have been 40, 30, 20 per cent, and even lower, of the pigs farrowed; and on the first year trial, crops of 70, 80, 90, and even 100 per cent, have been raised. More significant than the specific cases which could be related are the observations from data of our Animal Husbandry Department of the Agricultural Extension Division, which is quoted as results of work in which we have been an active part. That department reports from records of 160 farms, the average litter of 5 pigs has been increased to approximately 7 pigs. This is more significant when measured on the basis that it takes the profits on 4 pigs to pay the feed bill of a sow and her litter. It can be readily appreciated that the profits above the 4 pigs is to be measured by the value and returns of the additional pigs. A future tabulated report of results, not available at this time, will be distinguished by the Nebraska Department.

We have found the results where the system is adopted to be in proportion to the diligence and extent to which it is applied. It has been our observations that even with omissions on the part of the attendant or owner, a measure of success sufficient to demonstrate a value is always evident. There are many modifications in the details of application, but it should be ever in mind that the fundamental principle will bear no modification. The more extreme the extent of application of the principle, the greater will be the degree of success. This is said from a contact with intensive and long established production and also with a virgin and newly developed production.

For comparative value, we can correctly align this system with anti-hog cholera serum, and class the value in adoption of this plan as a thing that will be equally as profitable to the swine industry, and as spectacular in results as has been the advent of the use of the serum. Unlike serum, which is administered as a treatment through a syringe, the application of sanitation under the proposed plan is commonplace.
and engages only the physical effort of the swine owner. For this reason we are confronted by a more difficult and tedious task in placing this into the hands of the swine owner than we had in demonstrating the value of serum. As it required a definite program of field activities to place serum properly before the swine industry, so will the McLean County System need receive equally as definite a plan of application, and must be backed by as much energy and efficiency.

This has been one of our problems in Nebraska during the past two years. When the first published description of the system proposed by Dr. Ransom reached us, and with it the release of the film "Exit Ascaris," which has come to play an important part in our program, we entered into a co-operative arrangement with the Extension Service of the Agricultural College for certain activities. We have, through this union, carried our work into the field and gained the attention of a certain portion of our swine growers, big and little. By telling of the system with the visualizing film, we have secured many to adopt it in their herd management. It has been our one object to lay before our audiences the problem in detail and to this end a veterinarian has explained and described the diseases and answered questions which demanded his knowledge, and a representative of the Animal Husbandry Department has reviewed how the plan could be applied under the local farm conditions. We have never wanted for a sympathetic group of swine owners, for experiences of losses and trouble in line with our explanation are quite common.

From these meetings contact with a limited number of swine producers has been gained on whose farms the system has been applied. It has always been desired to have such demonstrations applied where losses have been sustained and the pig crop scanty. Through such demonstrations it is proven locally that the system has the merited value we have expressed and that it is practicable as well as profitable.

In addition to our meetings, the film has been the nucleus of other centers of activity. Local practicing veterinarians have put the subject before many groups of farmers even at personal expense. We have endeavored to have every practitioner acquainted with the system in all its detail. The Animal Pathology Department under Dr. L. Van Es has on a number of occasions presented this subject to the individual swine owner seeking advice of his office and to groups of farmers who have on various occasions been assembled at the state college. It may appear that we have been fanatic exponents of this system of sanitation. Perhaps we have, the results justify some excitement if thereby we can put the system into the management of Nebraska swine herds.

During the past year, our program was arranged for a series of meetings in each of ten of the chief swine producing counties. These meetings have been preceded by some well directed publicity and associated assistance. The Agricultural Engineering Department has given through this associated co-operation, attention to the proper housing, particularly as to individual cot houses. That department has prepared blueprints and cost estimates on small houses which have been distributed direct to interested persons or through local lumber dealers are available to the swine grower. The agronomist and crops depart-
The development of a program to carry this progress to additional counties has been the subject of thought in advising as to the necessary crop rotation and the securing of pasture needs. This expert assistance is desirable to support such a radical change as is necessary in passing from the time-honored hog lot to an era of pig crop rotation.

This year it is the intention to carry this program to ten additional counties fortified by changes which from experience it is believed will make the work more successful. The individuals whose operations have become demonstrations will be held in contact usually through the office of the County Farm Bureau, which has been the agency for arranging meetings and directing the local work. The joint co-operation as herein related has been the basis for whatever success that can be claimed. Such a program need not occupy any considerable portion of the time of these various co-operators but there must be a definite plan of action for which a certain group composed of the veterinarian and animal husbandmen is responsible.

My personal opinion is, that such a program should occupy the attention and have the interested support of the livestock sanitary regulatory department. Though in a larger measure a work advanced from an educational attack, no one thoroughly conversant with the field will deny the valuable aid that can come from the state regulatory officials. In solution of many of the problems of individual or community needs appearing before such departments, prevention rather than curative agents must be applied, and this system will be called into play when a last analysis of many swine cases is made. For the livestock sanitary official to become an active part of a program of this nature is equally as important to the swine industry as is the part his department may play in any other livestock disease prevention program. The problem is as specific and is to be measured in the same kind of dollars.

The work in these counties in which we have thus far been engaged is not complete until the program has been resold and this time to the related business interests as well as more widely to the swine industry. The banker, the merchant and associated financial interests should understand this program and its merits equally as well as they do the value of anti-hog cholera serum, blackleg biologics, etc. These men are today apparently more occupied in advancing the sale of powders and other patent remedies, because the advocates of those products have appreciated the value of their support. We should carry our program equally as far and solicit this support for a product of greater dividends.

We are always cautious that we do not create a belief that the system is a panacea for all diseases affecting swine. We direct emphasis on the fact that hog cholera must be fought as we have been fighting, with serum. We encourage systematic continuous immunization as the better policy in fighting hog cholera. Other diseases of mature swine, such as abortion, bloody diarrhea, flu, etc., must be reckoned with, but we have a right to expect and believe benefits will be had in our fight against these maladies where a sanitation system so efficient as this has been applied. Much could be added, but we will conclude with the statement that from our observations and experiences the system is sound, practical, and is a good investment.
TUBERCULOSIS AND ITS TRANSMISSION.

Charles H. Mayo.

I am glad to have this opportunity to be present at a meeting of the United States Live Stock Sanitary Association, whose members consist of physicians, veterinarians, and a host of others interested in disease and its prevention. There are in the United States 5,500 accredited veterinary surgeons, and 2,000 who are not accredited. The number of students now attending veterinary medical schools is growing less each year. The wonderful opportunities afforded by the few schools of sanitation and general public health training are going begging. It would be well to combine these schools with schools of veterinary sanitation and public health in order to enlarge the opportunity for service.

Domestic animals are carriers of disease, and as such are a menace not only to each other, but to human beings as well. Caring for the diseases of our domestic animals and the prevention of disease among them is not only interesting work, but enormously important from an economic standpoint. Many of our best business men whose children are grown up, or who do not have children, only think of sickness as an economic disaster, and are wholly forgetful that health is relative, and that death eventually comes to all, and sooner to those who neglect themselves or are infected by diseases that could be prevented by better public knowledge, or better control in the departments of health.

Children are not responsible for their diseases and too often their parents have little knowledge concerning the transmission of disease, or conditions causing poor health and increasing susceptibility to it. Caring for dumb animals is like caring for young children; they cannot answer questions or describe their symptoms, so the most successful physician of all is the one who has developed his powers of observation to the highest point.

One fact is certain, that you veterinarians are not troubled with the brazen effrontery of ignorant practitioners of some special method of treatment; they only exist in cities. The veterinarian today, with the great advent of motor power traveling, has almost been forced out of the city to the farm, where there are still domestic animals. Their care, when sick, is an economic problem. Whether they had best be killed or be saved, and whether the type of disease, such as hog cholera, is one that will spread among similar animals are important questions. I have not noticed that there are any advocates of cults among veterinarians who recommend some type of machine that will force the vertebra in the hog's neck back into place, the displacement of which has caused the disease hog cholera; each day new hogs, becoming sick, slip their vertebra and die. Adherents of these cults do not have the common knowledge that certain diseases of animals are infectious and caused by germs, just as they are among human beings, as they have not had a farm experience. The hard-headed farmer takes no stock in fads, and

*Read by title before the United States Live Stock Sanitary Association, Chicago, December 4, 1924.
so similar does he find the diseases of various animals to those of his family that he knows sickness is a result of infection, or a result of microbic or parasitic bacteria living in the body and causing damage to its tissues.

With the appreciation that many of the diseases of animals may become a source of danger to the people about them, or to those who use their products, will come an appreciation of the need for more veterinarians, and for better inspection of the dairy herds of our country. This should call for a veterinarian in every city as general food and dairy inspector, who will test cows for tuberculosis, so that milk will not carry disease to innocent children. City farms should be developed, with a veterinarian at the head, to keep the city clean from garbage, thus reducing the danger of infections carried by flies. Such a model farm would give the veterinarian an opportunity to educate the public with regard to what a healthy animal is, and with regard to the care and the prevention of diseases among them. The income from the farm would not only pay its own expenses, but the expenses of the health office in all but the larger cities.

Of the 8,179,000 head of cattle killed in this country in the year ending June, 1921, 173,328 were condemned as tuberculous; of these 38,328 were condemned in toto and sent to the rendering plant; 18,000,000 pounds of meat. During the same period 10,000,000 pounds of hogs were condemned for tuberculosis.

Ninety-five per cent of the scientific knowledge of the world has been developed within the last hundred years, and the greater part within the last fifty. Knowledge concerning tuberculosis was developed in four stages: (1) in the seventeenth century when little was known concerning it and it was called the Frenchman's disease, it was considered a social menace; (2) in 1865, when Villemin, following the work of Pasteur in his study of infectious diseases, demonstrated that tuberculosis was communicable from animal to animal; (3) in 1882, when Koch found the bacillus of tuberculosis, and in 1890, developed his tuberculin from dead bacilli, and (4) when professor Adolph Calmette, of France, who had developed vaccine tests in diagnosis, now with an attenuated but living bacillus of tuberculosis, has developed a living culture, which, if introduced into animals exposed to tuberculosis, will prevent their becoming infected. Revaccination once every year will maintain immunity. The same prophylaxis has been carried out in 247 children with like result; these children had tuberculous mothers, and lived in a poor environment, and one in which other children were being constantly infected by tuberculosis.

The slight difference in type or form between the bacillus of tuberculosis of man and that of animals has led to much dispute. By gradually varying culture mediums, much higher or lower degrees of virulence may be produced in most germs. Direct attempts to inoculate different kinds of domestic animals may apparently fail, yet it is known that cattle rapidly infect each other; healthy hogs in the same yard with infected animals become infected, as do the poultry, a sufficient number of bacilli in varying forms existing in the yard manure.
By education, care, and the selection of better dairy and beef cattle free from disease throughout Minnesota from 1908 to 1918, tuberculosis among the animals was reduced 75 per cent, and now every endeavor is being made to stamp out tuberculosis from the dairy herds, county by county. Many of the counties have made recent appropriations for this purpose. Five per cent of the hogs in Minnesota are shown to have tuberculosis. Among cattle it has been reduced from 9.4 to 2.4 per cent in ten years. This is a much better record than have the bordering states. Throughout the countries of Europe the percentage of animals condemned for tuberculosis has ranged from 10 to as high as 50 per cent, the average being between 20 and 30 per cent.

Thirty years ago, 200 of each 100,000 persons in the United States died from tuberculosis; today the proportion is less than 97 of each 100,000. This is the result of the education of the public by free and open discussion of prevention of disease, and of better sanitation. The elimination of public drinking cups and the checking of spitting have aided in preventing tuberculosis. The common knowledge concerning the care of those who have the disease prevents its distribution and tends to a much higher rate of recovery than years ago. It is possible to almost eliminate the disease in human beings, as well as in animals.

Every tissue of the body is susceptible to infection by tuberculosis, either primarily or secondarily. The germs may enter a wound, but in most instances are introduced into the alimentary canal through food or drink. The tonsils, when infected, become a local focus and cause tuberculous glands of the neck, cervical adenitis, the old scrofula of years ago. From 2 to 5 per cent of tonsils removed in various cities show chronic tuberculosis, either of the bovine or human type. From the alimentary tract the bacilli of tuberculosis are absorbed, at the same time as the food, through the intestinal wall into the lymph system, and thus are delivered into the blood. The glands in the abdomen connected with this absorption area are often infected, usually from the bovine type of bacillus. After a period of from one to several years these glandular infections may clear up, although they not infrequently so reduce resistance that death results from tuberculosis or some other disease, or they may cause several years of sickness and stunted growth with mental impairment.

The first regressive change in a diseased gland is fatty degeneration; following this is a deposit of calcium. Tuberculosis of the intestinal mucus membrane and of the genital tract may be either bovine or human in type. Although in domestic animals and fowls the liver is frequently tuberculous, it is but rarely involved in man. Of a large number of cases of abdominal tuberculosis, I have seen but one of the avian type. A large tuberculous spleen had developed, and yellow spots were scattered through the liver, as is noted in tuberculous turkeys and chickens and other farm animals. Cats and dogs are also subject to tuberculosis, and such pets may endanger the health of their child playmates.

Robertson, who for more than twenty years has been in necropsy work, formerly in the University of Minnesota, and during the last few years, in the Clinic, reviewed the findings of a number of years in a
very large necropsy service, and found that succeeding generations are
developing a gradual immunity to tuberculosis. It has been said that
from 70 to 85 per cent of all persons were infected by tuberculosis at
some time in their life, but this percentage is gradually lowering.

The work of the United States Live Stock Sanitary Association in
the prevention of tuberculosis in animals and man is being welcomed by
the American people who fear the disease and are ready to follow the
plans prepared by this society for its abatement.

PRESIDENT FERNEYHOUGH: Dr. Hayes was in Virginia on one
occasion and he did most excellent work. While a good man succeeded
him we were very, very sorry to have him leave us. You have heard the
paper be read and you are bound to agree it is an excellent paper.

Our next speaker certainly needs no introduction. I was afraid he
had gone off with Dr. Mayo, but he arrived all right.

Dr. J. F. Mohler, Chief of Bureau of Animal Industry, Washington,
D. C., has a mighty tough position to fill, if you will pardon me for
using the slang expression. When you stop to think he has to contend
with all of these cranky state officials as well as with the live stock
owners and his own force, you know he has a right tiresome job. He
certainly has proven to us all that he is a most efficient official, and I
want to say this to you gentlemen: I am not saying this for any flat-
tery, but I live down in Virginia very close to Washington, and Dr.
Mohler has been a wonderful help to me in my work, and I have oc-
casionally called on him. He is one of the most considerate men. I
knew him before prohibition went into effect, and I still know him. I
have been with him in and out of court. I have seen him on the wit-
ness stand, and I have seen him at the lunch table, and he is the same
Dr. Mohler.

This year, I fear that many of us can hardly realize what he has
had to contend with.

I remember then years ago when we had just a mild, you might say,
outbreak of foot and mouth disease in Virginia as compared to what
we have now, and I tell you it is a right serious proposition. When you
go to quarantine everything you almost throttle commerce. It is the
hardest thing in the world to conceive what the official, who has it in
charge, has to contend with, and this task which he has had this year is
absolutely gigantic.

I will now introduce Dr. Mohler who will talk to you on foot and
mouth disease and give you illustrations by moving pictures. (Applause.)

Dr. Mohler presented his subject, "The California and Texas Foot-
and-Mouth Disease Outbreaks" and showed moving pictures.
THE CALIFORNIA AND TEXAS FOOT-AND-MOUTH DISEASE OUTBREAKS.

By J. R. Mohler, Chief of Bureau of Animal Industry, Washington, D. C.

After entire freedom from foot-and-mouth disease since the outbreak of 1914, this country during the present year has experienced two invasions of this foreign animal plague, the first one in California, the second one in Texas.

The California Outbreak.

The first intimation the bureau had that the disease might exist in California was a telegram received on February 20 from Dr. Rudolph Snyder, in charge of its field work in that state. Following a series of inoculation tests the disease was officially confirmed on February 23 and on that date a large force of employees, practically all of whom had had experience in previous outbreaks, was directed by wire to report immediately at Oakland, California. The employees selected for this assignment were those who under the plan that the bureau had worked out several years ago were to occupy key positions.

On this same day an order issued by the Secretary of Agriculture placed under quarantine the counties of Alameda, Contra Costa and Solano. State Live Stock Sanitary officials, especially west of the Mississippi River, and officers in charge of animal disease work in foreign countries, were advised by wire of this outbreak. Bureau inspectors in charge of field work in the western states were also notified by wire that the disease existed in California and were directed to be on guard. On February 25 the Federal quarantine was extended to cover the counties of Napa, Marin, Sonoma, San Mateo, Santa Clara and San Joaquin.

The disease was first observed in two dairy herds, one near Oakland, the other at West Berkeley. Headquarters were established at Oakland. Hon. G. H. Hecke, State Director of Agriculture, and Dr. J. P. Iverson, Chief of the State Division of Animal Industry, directed the state forces engaged on the work. Dr. Rudolph Snyder was placed in charge of the federal force. On April 24, at the request of Governor Friend W. Richardson and Director George H. Hecke, of California, the Federal Department of Agriculture took full charge of the campaign to eradicate foot-and-mouth disease. Headquarters were established at Sacramento with Dr. U. G. Houck, of the Federal Bureau of Animal Industry, in charge of both state and federal forces.

The policy of promptly slaughtering infected herds, cleaning and disinfecting infected premises, and remunerating owners for animals and property destroyed had proved so successful in previous outbreaks that it was adopted in the handling of this one without a moment's hesitation.

The work of organizing the forces to suppress the outbreak was quickly accomplished. The first diseased herd was buried on February 28 and on March 22 the disease had been virtually eradicated in the Oakland area, to which it had been confined up to that time. On that date, however, infection was discovered in a large range herd of cattle in Merced County, which is one of the important stock raising sections of the state. The situation confronting the state and federal forces thus
over night became more alarming than at any time since the disease was first discovered in California. Another draft of bureau employees was ordered to this locality and the state forces were increased. The situation was further complicated by the spread of the disease within a few days to a large number of herds in that county and to nearby herds in the counties of Madera, Mariposa, and Stanislaus. These counties, comprising what was known as the Merced area, were placed under quarantine on March 24.

The infection was carried to the Los Angeles stock yards from Merced County in a lot of cattle forwarded three days before it was known that infection existed in that county. On March 24 an affected animal was found as it was being unloaded into the yards of a slaughtering establishment at San Francisco. This animal was one of a lot shipped from Merced County. Los Angeles and San Francisco counties were placed under quarantine on March 25. On March 27 the disease was found near Stockton, San Joaquin County. The infection in this instance was also traceable to a shipment from Merced County. San Joaquin County, however, had been under quarantine since February 25. The disease was stamped out in that county with but little difficulty and there was no spread of the infection at San Francisco. In Los Angeles County, however, the disease was spread to the holding pens of numerous slaughtering establishments, to large feed lots and to dairies in their vicinity. The situation in that county was very serious and one of the most valuable Holstein herds in the country, in spite of every precaution that could be taken to prevent infection, contracted the disease. Efforts were made in this area to salvage a large number of cattle which were located in close proximity to infected premises. About 4,000 of these animals were slaughtered and passed for food, after receiving careful inspection. The salvaging of these animals saved the State and Federal governments approximately a quarter of a million dollars.

Other counties in which outbreaks occurred were Kern on April 2, San Bernardino on April 21, Orange on May 2, Tulare on May 17, Tuolumne on May 9, and Fresno on May 12. A total of 16 counties became infected out of the 58 in California. In all of these except Tuolumne the outbreaks were limited and were stamped out quickly without involving any great number of animals.

In Tuolumne County the situation from the beginning was very serious. The diseased herds were ranging in a mountainous and inaccessible country and in spite of every measure that could be taken to prevent infection, contracted the disease. This necessitated a war of extermination against deer on these two ranges.

Eradication work in California was carried on under greater difficulties than had been encountered in any of the previous outbreaks in this country. Among these difficulties may be mentioned the spread of the disease to large herds of cattle and flocks of sheep in a rough, inaccessible and poorly fenced country suffering from the worst drought experienced in 30 years, inability to secure adequate trenching apparatus quickly, and the delay in excavating on account of the character of the soil, which in many sections was underlaid with hardpan and rock.
In spite of all these obstacles the campaign was waged with such energy and skill that control of the disease in all infected areas was definitely established before the end of July. Since then new infection has been found only in Los Angeles and Tuolumne Counties. In the former, the last diseased herd was disposed of on August 23; in the latter on October 9.

The animals on their return to their home ranches from the Stanislaus National Forest were kept under close observation while on the trail and are still being inspected at regular intervals.

The source of the outbreak in California has not been definitely determined. There is strong evidence, however, that the infection was introduced in garbage or other refuse from a vessel from the Orient which docked at the Mare Island Navy Yard. The first appearance of the disease was in hogs near Vallejo, which were being fed on garbage obtained from that yard.

Embargoes against agricultural products imposed by many of the states caused tremendous losses, not only to the agricultural interests of California, but to many other interests both within and without the state, without, in our opinion, affording any increased protection to the live stock interests of the states concerned. It is very probable that the losses suffered as a result of these drastic and, in some instances, unnecessary embargoes were greater than those due to the enforcement of carefully considered federal and state regulations promulgated with the single purpose of effecting eradication of this disease.

The extent of the California outbreak, the number of animals involved, and their appraised value, are shown in the following table:

<table>
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<th>County</th>
<th>Herds</th>
<th>Cattle</th>
<th>Sheep</th>
<th>Swine</th>
<th>Goats</th>
<th>Total Animals</th>
<th>Appraised Value</th>
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<td>7</td>
<td>333</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>340</td>
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<td>518</td>
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<td>0</td>
<td>387</td>
<td>0</td>
<td>964</td>
<td>31,287.50</td>
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<tr>
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<td>83</td>
<td>10,442</td>
<td>3,424</td>
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<td>113</td>
<td>14,201</td>
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<td>Totals</td>
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<td>58,734</td>
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<td>21,123</td>
<td>902</td>
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<td>63,632.26</td>
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The Texas Outbreak.

The outbreak of foot-and-mouth disease in Texas was officially confirmed on September 27, 1924. Reports reaching the bureau on September 26, however, were so indicative of the disease that a force of employees experienced in foot-and-mouth disease eradication work was directed by wire on that date to proceed to Houston, Texas, and a depart-
ment order quarantining the counties of Harris and Galveston, and those portions of Fort Bend and Brazoria east of the Brazos River, was issued.

The infection first manifested itself in a heard of zebu cattle south of Houston. Hon. J. E. Bogg-Scott, chairman of the Texas Live Stock Sanitary Commission, and Dr. L. G. Cloud, State Veterinarian, immediately proceeded to that point and assumed charge of a considerable force of state employees. Dr. Marion Imes was placed in charge of the bureau employees. At the request of Governor Pat M. Neff, of Texas, the department, on October 1, assumed full charge of the eradication work in that state, the combined forces being placed under the direction of Dr. Imes.

This outbreak was promptly suppressed within 30 days, only 9 herds contracting the disease. No new infection has been found since October 27.

A thorough investigation is being made to determine, if possible, the source of the infection in this instance. So far it has been impossible to determine definitely the channel through which the infection gained entrance into this country. No connection has been established, however, between this outbreak and the one in California.

The extent of this outbreak is shown in the following figures:

<table>
<thead>
<tr>
<th>County</th>
<th>Herds</th>
<th>Cattle</th>
<th>Sheep</th>
<th>Swine</th>
<th>Goats</th>
<th>Animals</th>
<th>Appraised Value</th>
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<tr>
<td>Harris</td>
<td>141</td>
<td>8,229</td>
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<td>61</td>
<td>0</td>
<td>8,290</td>
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<td>Galveston</td>
<td>1</td>
<td>239</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>266</td>
<td>9,462.00</td>
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<tr>
<td>Totals</td>
<td>142</td>
<td>8,468</td>
<td>27</td>
<td>61</td>
<td>0</td>
<td>8,556</td>
<td>$325,012.50</td>
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<tr>
<td>Property destroyed</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>$325,041.36</td>
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</tbody>
</table>

*All except 9 were exposed herds.

Conditions in both of these states are considered very good at this time. It will be necessary, however, to continue a force of men in the field for the next two or three months, and as a precautionary measure the Stanislaus National Forest will not be opened for grazing next year.

Ten Lessons from the Recent Outbreaks.

1. Accurate Diagnosis. The importance of carefully examining animals exhibiting suspicious symptoms and continuing such examination until it is definitely determined whether or not the affection is foot-and-mouth disease cannot be stressed too strongly. The failure of a local veterinarian in the central part of California to recognize the disease in a herd of range cattle which he was called to examine, although a number of the animals were very lame, resulted in a tragedy to the live stock and business interests of the southern part of the state. His snap diagnosis of gravel lameness in this instance, which permitted exposed cattle to be shipped to the stock yards at Los Angeles, San Francisco and Stockton, caused a loss in the Los Angeles area alone of approximately 12,000 cattle and 8,000 hogs, including one of the most valuable Holstein herds in the whole United States, without taking into account more than 7,000 cattle in a half-finished condition which were slaughtered and salvaged to prevent their contracting the disease.
2. Prompt Notification by Telegraph or Telephone. Every moment's delay in notifying the state or government of a suspicious case, especially in any new outbreak of foot-and-mouth disease, is an unnecessary hazard and may cost our citizens millions of dollars. In one case a telephone message to a stock yards would have headed off a consignment of exposed cattle which could readily have been diverted and salvaged by slaughter. Instead a letter was written, which was not received until after the cattle had been unloaded and had infected the yards. In another case a letter was written which contained such important information that a telegram or even a radiogram would have been justified. The failure to adopt the speediest form of communication permitted one owner to cut out and throw on the open range 51 stray cattle found on his ranch just eighteen hours before his herd was found infected. These 51 stray cattle will cost Texas $100,000, as every contact animal on the open range in that vicinity immediately became a potential spreader of this disease and had to be slaughtered. Furthermore, this not only extended suspicious territory, but will serve to prolong the period of costly quarantines and embargoes.

3. Frequent and Thorough Inspections. By making such inspections of all herds in the vicinity of infected premises the disease was discovered in its incipiency and the propagation of the virus and its spread to other herds was reduced to a minimum.

4. Early Slaughter and Burial of Diseased Herds. That this is essential if the infection is to be effectively combated was clearly shown by the fact that in those instances where there was unavoidable delay in disposing of herds of cattle on account of the large number of animals involved, inability to secure trenching apparatus quickly, and delay in excavating on account of hardpan and rock, there was frequently considerable spread of the infection to nearby herds, whereas in those instances where the organization was such that diseased herds were buried within twelve to thirty-six hours after the infection made its appearance in the animals there was little, if any, spread of the disease to other premises.

5. Optimism Necessary. In an atmosphere where owners are losing their means of earning their daily bread, where children are seeing their pet lambs and calves shot down and buried in quick lime, and hired help are forced to look elsewhere for jobs, it ill becomes any official of foot-and-mouth disease work to show the slightest sign of pessimism. Yet in all our outbreaks we have met men who from the sidelines have loudly exclaimed that eradication was impossible, that we were spending the money to no possible advantage, that the fight was lost before we had scarcely begun, that flies, bumble bees, baby chicks, etc., were important factors which we were ignoring, that infected deer would carry the infection to the Mississippi River, that slaughter and disinfection were unscientific, but on the other hand saltpeter and sulphur or some other clap-trap would at once stop the disease like it had in the self-styled discoverer's home country, which, as proved frequently the case, was a country like Germany or Italy, where all such concoctions had failed to prevent the infection from becoming firmly and permanently implanted. All leaders in foot-and-mouth eradication particularly should be opti-
mistic, for they are the generals fighting a hidden foe and they must keep up the morale of their assistants. While their hours are long and their labors arduous, these leaders, as a rule, are not exposed to the shot and shell, the whims and tirades of the owners and the owners' friends, nor to the strange food, improvised beds and climatic changes of the men in the trenches.

6. Veterinarians Should Be Used Only Along Professional Lines. As has just been stated, in the early days of the California outbreak veterinarians were used unduly in the trenches. Veterinarians shot down the cattle, sheep and hogs in the trenches. Then they went into the trenches and slashed the hides and opened the abdominal cavities to permit a leveling of the surface and early decomposition. Later expert marksmen shot the animals and laborers did the slashing and cutting of the carcasses. This permitted the veterinarians to perform professional services in diagnosing and differentiating diseases, in surveying adjacent territory, tracing rumors, addressing meetings, answering inquiries and performing other duties of a related character. Of course, emergency cases will occur when a veterinarian will have to do some shooting and slashing, but in order to conserve the services of the expert this should be the exception and not the rule.

7. Slaughter Method—the Most Effective and Economical With Our Present Knowledge of the Disease. Losses under this method, including indemnities, operating, and all other expenses, have not been as great in suppressing the outbreaks in this country during the past 40 years as they would be in one year if the disease became established here and was fought by continental European quarantine and treatment methods.

8. Quarantine of Infected Premises Must Be Stringent. All avenues through which infection might escape should be completely closed. No movement of live stock or commodities should be permitted from such premises. Dogs, cats, poultry, pigeons, etc., must be confined or killed. Guards should be properly placed in order to strictly enforce all quarantine measures.

9. State Quarantines Often Too Drastic and Not Based on Experience With or Scientific Knowledge of the Disease. Such embargoes caused tremendous losses not only to the agricultural and commercial interests of California, but also to these interests in all parts of the country.

10. Organization of Forces. Consolidation of state and federal forces under unified control avoided duplication of work and conflict in eradication methods.

PRESIDENT FERNEYHOUGH: I think, if Dr. Mohler was telling the truth, and he sometimes does, that that message to Washington certainly brought results. I am certainly very much pleased with what Dr. Mohler has presented to us this morning. It is merely a record, gentlemen, of facts, of past history, and a warning of what we must look out for in the future.

We will now have "The 1924 Outbreak of Foot-and-Mouth Disease," by G. H. Hecke, Director, State Department of Agriculture, Sacramento, California.
THE 1924 OUTBREAK OF FOOT-AND-MOUTH DISEASE.

By G. H. Hecke, Director. State Department of Agriculture, Sacramento, California.

On February 18 a telephone message was received by Dr. J. P. Iverson, Chief of the Division of Animal Industry, California Department of Agriculture, from the county live stock inspector of Alameda County, Dr. J. J. Hogarty, advising that cows in a small dairy herd in West Berkeley exhibited suspicious symptoms of foot-and-mouth disease. On the following day another practicing veterinarian reported suspicious symptoms of foot-and-mouth disease in a large dairy herd in another part of Alameda County. Examinations and tests made under the direction of Dr. Rudolph Snyder, in charge of Bureau of Animal Industry field work, and Dr. Iverson, in cooperation with Drs. Traum and Hart, veterinarians of the University of California, revealed that the affection was, in fact, foot-and-mouth disease. During the several days necessary to establish a diagnosis by animal inoculations, rigid quarantines were established on premises where the affection was found and live stock movements in Alameda County were prohibited by an order signed by the Director of Agriculture.

As soon as it became evident that we were dealing with foot-and-mouth disease all available federal and state veterinary inspectors in California were rushed to Oakland, where combined federal and state foot-and-mouth disease headquarters were established. As usual, Dr. J. R. Mohler, Chief of the United States Bureau of Animal Industry, was quick to respond with advice and instructions by telegraph, and in addition promptly detailed what was then considered a sufficient number of experts to report to Dr. Snyder for duty.

At this time, as a result of farm to farm inspections, the disease had been discovered on a number of premises in Alameda, Contra Costa and Solano Counties. These counties, in addition to Napa County, were placed under closed quarantine by the Governor, and in addition seventeen surrounding counties were placed under provisional quarantine.

As you are aware, the disease later spread from the originally quarantined area into Merced and Mariposa Counties by some means as yet unknown, but probably by a human carrier. From Merced County the infection was carried by animal shipments to San Francisco and Los Angeles Counties before its presence became known in Merced County. Ultimately sixteen counties became infected. In the majority of these, the outbreaks were limited and were quickly stamped out. In several counties, however, the situation became serious. In Los Angeles County the pens of many abattoirs became infected and from these places the disease spread to the congested dairy sections in that county. On May 9 the infection was carried into the rough, mountainous region of Tuolumne County, bringing about foot-and-mouth disease control problems without precedent in this country.

In tracing the origin of the infection it was found that the disease had existed, unknown to officials and veterinarians, for a period of at least 67 days before its discovery by Dr. Hogarty. The owner of a
herd of hogs located near Vallejo, about 40 miles from the place where Dr. Hogarty first found the infection, had noticed lameness and stiffness, as he termed it, among his hogs since December 10, 1923. His statement was corroborated by others. This man had made shipments of fat hogs to an abattoir located in West Berkeley after lameness had appeared in his herd. Investigation revealed the fact that this abattoir had been a distributing center for the disease some little time before it was discovered. This herd of hogs at Vallejo was undoubtedly the first herd infected.

Many theories have been advanced as to how the disease might have been introduced. Those offering a possibility of solution were investigated, but ultimately it narrowed down to the feeding of garbage that might have been contaminated with the virus of foot and mouth disease. The owner of these hogs had a contract with the Mare Island Navy Yard to collect ship garbage, which was fed to his hogs. It is presumed that meat contaminated with foot-and-mouth disease virus was taken on by one of the vessels at an Oriental port. Without discussing this subject in detail, I might state, however, that this evidence is purely circumstantial.

With the exception of Stanislaus National Forest, there has not been an outbreak of the disease in California since August 23, and all quarantines in the state, with the exception of that covering this forest, have been withdrawn. All animals have been brought out safely and none will be permitted to enter there next year.

Until April 23 the federal and state forces were working in full accord and harmony, but for some time the Director of Agriculture had realized that the problem was really a national one; this became more evident day by day as drastic restrictions, as well as embargoes, were placed on shipments of various agricultural products and commodities from California. It furthermore became apparent that a centralization of command would be productive of the best results, and acting on these impressions the Director of Agriculture suggested to the Governor that the Secretary of Agriculture be requested to assume entire control of the outbreak. This request was made to the late Secretary Wallace, and complying therewith, on April 23 Dr. U. G. Houck was detailed to this commanding position. All state employees were immediately made collaborating federal officials and were subject to instructions and orders issued by or through Dr. Houck.

The only comment I have to make regarding this arrangement is this: if I had to contend with another outbreak of foot-and-mouth, or other destructive animal disease, I would not hesitate to recommend at the very beginning that the entire command and authority be placed under the supervision of the United States Bureau of Animal Industry.

Probably at no time before in the history of this country has a state been inflicted with so many and such drastic quarantines. I am not complaining, or criticizing any state, for while we believe that some of these restrictions and embargoes did not afford any increased protection to the live stock interests of the states in which they were promulgated, I realize that this was the sole purpose for which they
were issued. However, I feel that we have learned some lessons from this outbreak, not the least of which is that the quarantine power of the states must be used uniformly and intelligently. I am therefore taking the liberty of giving you my impressions and offering some recommendations on this subject.

The question as to what constitutes the proper course of a state in endeavoring to protect itself against the introduction of diseases of plants or animals is one that has occupied the attention of officials and others interested for many years. Two extreme views of this subject are often expressed, one that all interstate shipments of such plants or animals should be governed entirely by laws and regulations of the federal government; the other that the state should, in all instances, act independently of the federal government. This condition is brought about, of course, by our unique form of government, in which we have forty-eight sovereign state governments included within the nation, in all of which the right to enact quarantine or inspection laws appears to be unquestionable.

In recent years, however, some of us who have carefully studied this subject and its many angles have arrived at the conclusion that this legal authority conferred on the federal government and states should be used complementally, then the benefits derived from such a system would be experienced not only in the prevention of the extension of the disease but in the elimination of duplicate effort and unnecessary restrictions as well. This idea brought about the creation of the Western Plant Quarantine Board which I organized in 1919. Later, in 1922, at a conference in Sacramento of the representatives of the Departments of Agriculture and other state organizations performing like functions in the Western states, I included the following statement in an address made at that time:

"I have always felt that we are neglecting our opportunities in the far West in not developing uniform action between the various states in matters relating to animal industry. We have rather stressed the importance of our horticultural problems in times past, but it seems that the time has been reached when, if we are to have a properly balanced agriculture, more attention will have to be paid to our animal industry problems. The cattle, sheep and other live stock interests of the West are exceedingly important. It is just as necessary that uniform quarantine regulations be established for the live stock work as for the fruit and vegetable industry. I think that it is a matter to which special attention should be given by this organization and I would suggest the appointment of a committee to consider animal industry and live stock problems with a view of incorporating into our organization these authorities in charge of law enforcement work with reference to the great live stock problems of the Pacific Coast states."

If my recommendations had been adopted in 1922 much of the confusion and loss experienced in California, from the lack of uniformity and in some instances unnecessary foot-and-mouth restrictions, would have been eliminated. Again having this in mind, when confusion was at its height a conference was arranged of officials of Western states in
Salt Lake City last March. As an emergency conference it helped materially to solve some of the problems by recommending to the various states the enactment of uniform regulations adopted at the conference.

A permanent organization was established in Salt Lake City and a later meeting was held at Reno, Nevada, at which time amendments to the Salt Lake conference regulations were discussed and recommended for adoption by the various states. Some of these modifications afforded considerable relief to California and still provided other states with ample protection.

With this great object lesson before us, are we going to remain in the old indifferent, chaotic condition of "every state for itself," or will we follow the example of the Western Plant Quarantine Board and organize the state for present and future contingencies, using to the best advantage collectively, in cooperation with the federal government, the authoritative power we have to prevent the extension of disease from state to state as far as is humanly possible so to do?

In my opinion the time for action is not only ripe but overdue, and the problem of interstate quarantines for the purpose of preventing the spread of animal diseases is of transcendent importance to the live stock industry of this country. A thorough understanding or better still, an agreement between the states and the federal government by which quarantines can be correlated along uniform lines, would not only be of tremendous value in preventing the spread of animal diseases, but would also save much misdirected effort of a destructive, rather than a constructive, nature.

In outlining the basis for such an agreement it would be well to define the scope of quarantine action. It is generally understood, of course, that quarantines are the only means that we have of controlling the spread of communicable diseases of live stock, and it is obvious that they should be made use of only when the benefit to a state clearly outweighs the expense, inconvenience and loss sustained by their enforcement. If this is borne in mind there is no danger of a state enacting a quarantine law or regulation which, while ostensibly an exercise of its police power, may be, nevertheless, actually an economic regulation. Such a perversion of police power may well become a two-edged sword.

Quarantines may be divided into (1) restrictive quarantines and (2) embargoes.

(1) Restrictive quarantines are, as a rule, sufficient to cover the following conditions:

(a) Where inspection and treatment of animals in the shipment are sufficient protection. As an example, the inspection of sheep for scabies prior to shipment, and the dipping of same if they originate in an area in which there is a possibility of exposure.

(b) For widespread diseases that also exist in state of destination and where the inspection will serve to assist in retarding further spread. The regulation requiring the inspection and testing of cattle for tuberculosis may be cited as an example.
(c) For diseases of considerable importance, but not so prevalent that there is a great likelihood, though a possibility, of animals so affected being offered for shipment. For example, such diseases as anthrax, black leg, hemorrhagic septicemia, hog cholera, etc.

(2) Embargoes. These should be used only when restrictive measures afford inadequate protection and are justified when the diseases are of the following types:

(a) Where they cannot always be determined with reasonable certainty by inspection, as for example, certain diseases of animals due to protozoa, such as surra.

(b) Where the diseases are of a highly infectious nature and capable of spreading rapidly among susceptible animals, as for example, foot-and-mouth disease, rinderpest and pleuro-pneumonia contagiosa.

(c) Where adequate protection and proper inspection facilities are not provided for at point of origin.

Now the problem for us to solve is to find a means by which the quarantine actions of the Federal Government and the states can be correlated, and also to provide a way by which this work may be made uniform by the states.

It is understood, of course, that the scope of a state quarantine should not conflict with an existing Federal quarantine, but in case state action is taken it should be supplemental to the action taken under the Federal quarantine. Such supplemental quarantine should only be taken by a state, however, when the Federal quarantine does not cover the entire subject necessary for its protection.

Furthermore there are conditions that might be termed local which are not covered by Federal quarantines. Such conditions must, of course, be covered by state quarantines. Many restrictive quarantines, and occasionally an embargo, come under the scope of supplemental and local state quarantines.

When there is danger of an infectious disease of animals being spread over a considerable area of the United States the problem is distinctly national in character and under such circumstances the states, in their zeal for self-protection, should refrain from instituting quarantines that might hamper the Federal Government in its efforts to control and eradicate the infection. By this I do not mean, however, that a state should in all instances surrender its police power, but on the contrary, if it were found necessary to supplement the scope of the Federal quarantine, care should be exercised to see that no unnecessary restrictions or embargoes are included within such quarantine action. Here also is where uniformity of action by the various states will prevent the state in which the disease exists from being inflicted with added burdens not only unnecessary, but also destructive in character. As an example of such uniformity I again refer to the Salt Lake Conference. Provision should be made in this country, however, for a permanent organization of State Live Stock Sanitary Officials and the U. S. Bureau of Animal Industry to handle such matters expeditiously. Such an organization should be enabled to carry on its activities when
necessary, both regionally and nationally within this country, or ma-
chinery should be provided within the U. S. Live Stock Sanitary. Associa-
tion for this purpose.

When confronted with a condition such as an outbreak of a de-
structive, infectious disease, such as foot-and-mouth disease, rinderpest
or pleuro-pneumonia, machinery should be ready for calling a meeting
of the executive committee of the organization or of the officials of the
regional states with the U. S. Bureau of Animal Industry. If at this
meeting it is decided that supplemental state quarantines are advisable
and necessary, a uniform quarantine should be approved and recom-
mended for adoption to the various states that consider such action
necessary.

Other lessons have likewise been learned from this outbreak, and
in briefly discussing some of them no idea of criticism enters my mind.

The question of the manner in which foot-and-mouth disease virus
entered California brought forward many theories, most of which were
plausible. With the greater part of the world infected with this disease,
and with increasing commercial intercourse between this and other
nations, how are we going to keep it, as well as other destructive animal
diseases, out in the future? I realize that the answer to this question
is difficult or impossible. However, it appears to me that additional
safeguards may be found that will at least reduce the hazard that now
exists. These safeguards can be increased in direct ratio to the degree
which we wish to interfere with commercial intercourse with foreign
countries.

Possibly a more rigid port inspection of incoming vessels would be
an added protection without undue interference with commercial rela-
tions. Such an inspection should cover the examination of the vessel
for live animals which might be carried as stores. It is not uncommon
for foreign vessels to take on live hogs or sheep and slaughter them
for fresh meat, when required. Naturally under these circumstances
forage will also be taken aboard for these animals, and both animals and
forage taken on board in ports where foot-and-mouth disease, or other
infections exist, may become a real menace. This inspection should
also cover the methods of garbage disposal while in port. None of this
garbage should be permitted to be used for animal food if the vessel
has taken on a supply of meat in the port of a country where one of
the destructive animal diseases exists. It might be safer to insist on
the storage of garbage while in port, and the dumping of same at sea
when the vessel leaves.

It is difficult to say how far we should go in protecting ourselves
when such protection would result in interference with commercial in-
tercourse. To obtain the fullest degree of protection would practically
mean a severance of such relations with an infected country. Of
course, this is impractical and also is an example of where the benefit
to the country would clearly be outweighed by the loss of business, the
engendering of hard feeling, etc.

Would we remove the greatest menace if the importation of fresh
meats, hides and unsterilized animal products was prohibited from
countries where these diseases exist? Some believe we would. If we did this, would there be sufficient interference with established business to warrant such an embargo?

These questions and others including interstate quarantines must be approached and solved by the representatives of the various states in co-operation with the proper officials of the U. S. Department of Agriculture, either through the medium of an organization such as this, or one created for the specific purpose.

California's fight against foot-and-mouth disease is, I hope, at an end. When it, or some other destructive animal disease, will again visit us, or you, no one can predict. While we may not succeed in preventing its introduction, it may be possible to reduce the hazard. In any event we can make no mistake by being prepared.

PRESIDENT FERNEYHOUGH: The next on the program is "Necrotic Enteritis in Swine," by Dr. Charles Murray, Ames, Iowa. Is Dr. Murray here? (Not present.)

Dr. Turner is not here.

If Dr. Flower is here we will have his address on "Anthrax and Its Control." (Not present.)

I don't think I have overlooked anything on the program. We will have a report from the Resolutions Committee. As soon as we have that report then we will proceed to elect officers.

DR. I. K. AThERTON: I wish to congratulate Dr. Hayes on that paper. It was wonderful. Like the statement that was credited to Colonel Sellers of other days, there is millions in it if you people appreciate what the word "sanitation" means, but if ever there was an abused word it is sanitation.

The proprietor of the white barber shop gives the front of it a new coat of paint and dubs it a sanitary barber shop. Tony gives his eating emporium a new set of enameled top tables and hands it to his customers as the last word in sanitation.

I hope I misunderstood the doctor, though, in part of the paper. I don't know but what he got away from sanitation. In the earlier part of the paper, as I took it, he stated that sanitary measures should be employed in regard to hog cholera. From the statement made in the latter part of his paper it appeared to me he was offering serum and virus as a substitute for sanitation. I hope I didn't catch that correctly, because if ever there was a disease that is amenable to sanitary measures it is hog cholera. I am surprised that hog cholera has been overlooked so much in this meeting. In any one year in the last thirty hog cholera has cost the farmers more than the entire amount expended in the entire outbreaks of foot-and-mouth disease and yet we have practically ignored it.

What is sanitation in regard to hog cholera? It isn't measures to eradicate the disease. If ever there was an infectious disease that will eradicate itself it is hog cholera. You don't need to worry about a hangover into next year unless people are employing measures to keep it. There isn't a month in the year but what every county in your state, not always the same month, is free of the disease. The problem
in hog cholera is not eradicating but preventing re-infection, and if that be the case then certainly sanitary measures to prevent the introduction, harboring and spreading of the infection are surely in order.

We know of three factors responsible for the introduction of the infection into free territory. I have been criticized by people who claim my statement on percentages is too high. I don't know whether they are or not, but they certainly are not in Maryland. I have tried to get from scientists a suggestion as to a force factor in introducing the infection into free territory. I have never gotten it.

I am not stating there are not other factors, but I do state they are unimportant compared with the three we have, which are, infected pork, infected or exposed hogs and abuse of the double treatment.

In this room, I believe it was, a statement was made that no effort is put forth to stop the movement of exposed and infected animals. In our foot-and-mouth disease, what do we do? We take every measure to prevent the disease from coming into this country. We take every measure possible to wipe out centers of infection. I don't believe anybody denies that can be stopped, but the doctor has put the employment of sanitary measures onto the farmer. Now, gentlemen, we as sanitarians cannot pass the buck. We must take the initiative that is going to stop this movement of sick and exposed hogs, that is going to stop this movement of infected pork, and stop the abuse of the double treatment. I don't believe anybody, after that center of infection has been established, is going to say we shouldn't employ sanitary measures, we shouldn't employ measures to prevent movement of infection from one farm to another. But, gentlemen, with the foot-and-mouth disease infection as long as there is a foci of infection the spread cannot be stopped. It is comparatively easy to stop the spread of hog cholera infection.

In Maryland, we have not yet had the spread of infection from a new outbreak in six years, where it was promptly reported. What are the spreaders from farm to farm? I can't tell you as much about that, in my own mind, as I can about the introduction of new centers of infection, but every place we can get a definite history regarding the spread of the infection from one farm to the other, it is due to the movement of animals, either sick or well, which are permitted to run at large, animals moved from one farm to another for breeding or other purposes.

Gentlemen, do you mean to tell me that sanitary measures, that care, if you please, cannot be taken to stop that? We had an object in cleaning and disinfecting of premises. Do you mean to tell me the premises on which hog cholera has existed cannot be properly cleaned and disinfected?

Dr. Dorsett's work has shown that a larger percentage of them are comparatively safe within a few hours, if not in a few days, and only in exceptional instances does the infection remain on the premises any length of time. Gentlemen, let us not forget, with all of the virtues of serum and virus, we need it.
Dr. Melvin, at the first meeting which was held to discuss the recently developed serum and virus, went on and stated, with the employment of sanitary measures we could get certain results, but we have not employed those sanitary measures. We have relied on the inoculation of swine and each year we are spoiling adding machines by totaling the loses. (Applause.)

PRESIDENT FERNEYHOUGH: Gentlemen, there was an old colored man who had four oxen he was driving. He stopped to water them. He said to one, "Get down there, Presbyterian, and get your water."

I said, "Why do you call him Presbyterian?"

"He don't care what happens. Nothing ever worries him. That is why I call him Presbyterian."

He turned to the other and said, "Get down there, Brother Methodist."

"Why do you call him Methodist?"

"He is always looking out for himself."

He turned another loose and said, "Get over there, Mr. Episcopalian."

"Why do you call him Episcopalian?"

"He is prouder than any of the others."

The old colored fellow went back and unchained a big ox which he had. He said, "Get over there, Brother Baptist."

I said, "Why do you call him that, and keep a chain on him?"

"If I didn't keep him chained I would find him in the cow pen."

You would have to put a chain on Dr. Atherton to keep him from saying something about garbage, but he brought out some points.

Is there anyone else who would like to discuss Dr. Hayes' paper?

DR. WHITE: In the absence of further discussion on hog cholera, I would like to ask Dr. Mohler to tell us something about the foot and mouth infection in deer in California, if he will.

PRESIDENT FERNEYHOUGH: We shall be very glad to hear from Dr. Mohler.

DR. MOHLER: The appearance of foot-and-mouth disease among the deer in California was not a surprise. In fact, it was anticipated for probably six weeks or two months before anything developed in that line. There were a lot of people who were very nervous and much afraid that deer would contract the disease or that the coyotes and other wild game would contract or spread it. Finally, in the early part of July when I was in California, I saw the first case of foot-and-mouth disease in a deer that was discovered in this country. The animal evidently had been very lame. The punched out areas on the mucous membranes were noticeable on the tongue and lips. The horn of the hoof was loosening at the coronary band. It was in fact a typical case such as we find in pigs and sheep. This deer was found in the section of Tuolumne County, known as the Niagara range, where we had killed some two or three thousand cattle on account of foot-and-mouth disease. This range was within the Stanislaus National Forest, which was inhabited by several thousand deer, and it was not at all surprising that infection should appear among them. As soon as the first case was discovered, an investigation was undertaken to ascertain the location
and extent of the infection among the wild animals of this forest. It was necessary to conduct this work in a quiet and orderly manner. Poisoned bait was used and an endeavor was made at once to see what percentage of infection occurred in deer. Some of the people in that section wanted to shoot the deer, but, of course, as you know the noise of the firearms would have scattered the deer and in all probability would have spread the infection to the twenty thousand cattle and thirty-four thousand sheep that were grazing on the surrounding ranges in this forest. So it became absolutely necessary to get a line on the infection by a milder way than by the use of firearms. Of 599 specimens taken and examined in that section of the Stanislaus Forest, there have been 226 reported as having foot-and-mouth disease and additional cases of infected deer have been received weekly. The percentage is around thirty-six per cent.

That is the reason why, as I stated at the time the film was being run, we are not ready to announce that California is free from foot-and-mouth disease. There has been no infection among live stock in Tuolumne County, in which the Stanislaus Forest is located, since the ninth of October, but we don't know but that there may be some infection lying dormant around the water holes or pools where diseased cattle were grazed. We do know that we saved the cattle and sheep by having them removed from this forest earlier in the season than usual. Nearly all of the live stock was out by the first of October. The strays that were left behind were killed and buried.

The Stanislaus Forest is adjacent to Yosemite National Park. It is a wild and rugged country with bluffs, peaks, canyons and mountains everywhere. The Dardanelles on the north are 9600 feet above sea level. The deer, especially the males, range in the higher altitudes during the warm season and in the fall, usually beginning some time in October, they are driven by storms from their summer ranges down to their winter ranges. In passing from the high lands to their winter feeding grounds they descend through valleys, canyons and gorges usually following the course of the streams.

At the present time the deer of the Stanislaus Forest are approximately settled on the winter range. They have come down from the high points to their winter range. We have a force numbering 65 men there watching for infection. This force will be increased later in the season. We are doing a certain amount of shooting since the livestock has all been removed from this forest, and we feel the results are very satisfactory.

However, in order to prevent any possibility of infection flaring up in that forest next year, Secretary Wallace, before his death, concurred in the opinion of keeping the forest entirely free from cattle and sheep for a whole year. There will be no summer range permits given to the live stock men in that section to take either sheep or cattle on that forest next season. There has been a considerable amount of snow, probably eighteen or twenty inches up in the mountains of Tuolumne County. The deer that come down from the high lands must walk over the snow and I am in hopes, and everybody else is in hopes, that the infection will be covered by the snow so the animals in getting down to
the winter range will not come in contact with infected pools or infected pastures.

I have stated briefly the situation so far as deer are concerned. The deer is susceptible to the infection of foot-and-mouth disease as you know. We have had exposed deer in other outbreaks, but it so happened that they did not pick up the virus. In the first outbreak in 1902 I saw several deer in Vermont in a barnyard with infected cattle. When disturbed these deer jumped over the fence and disappeared and there were no outbreaks in the neighborhood as a result of these deer mingling with infected cattle.

In the outbreak in 1914 some deer were seen in pastures with an infected herd of cattle in Montana and the disease was not spread as a result of infection among deer. Of course, they are factors. How important deer are as factors in the spread of this disease we don't know, but we are taking every precaution to eliminate this potential danger. We have the men down in the foot-hills looking after the herds with which infected deer may mingle, just as we did at the height of the campaign. They are there to detect the infection promptly in case it appears among cattle from deer infection.

If there are any other questions you wish to ask me concerning deer or other matters relating to foot-and-mouth disease I shall be glad to give you the information if I am able to do so. (Applause.)

PRESIDENT FERNEYHOUogh: Here is a report from the Resolutions Committee and approved by the Executive Committee:

RESOLVED, That the United States Live Stock Sanitary Association now in session recommends that the vaccination of cattle and sheep against hemorrhagic septicemia and the vaccination of cattle against black leg in public stockyards be done by a-qualified veterinarian; and be it further

RESOLVED, That the Secretary of Agriculture be requested to promulgate uniform rules and regulations for the vaccination of cattle and sheep in public stockyards, including direct supervision of all such vaccination by the B. A. I."

DR. MAYO: I move it be adopted.

The motion was regularly seconded.

DR. MILLER: Some one spoke to me about the resolution, and I said at that time I didn't see anything objectionable, but there is one clause in there that certainly didn't come to me. That is the one which provides for the promulgation of regulations by the Secretary. I take it that that would cover vaccination against hemorrhagic septicemia. It seems to me we have gotten to the point where we are not in a position to take any definite action on the proposition, and I would rather be inclined to move that that one clause be eliminated.

PRESIDENT FERNEYHOUogh: You are referring to the part which says the Secretary of Agriculture be requested to promulgate regulations for the examination of cattle and sheep. Do you want to offer an amendment?

DR. MILLER: Yes. I would like to amend the motion by having that clause stricken out. This will largely be a matter for state au-
As far as the immunization of swine is concerned, we have a regulation that covers the interstate part of it and probably supervising eighty-five per cent of the immunization. That work is being performed by qualified veterinarians under the supervision of the bureau. There are a few places where the work is being carried on so far as intrastate shipment is concerned, without supervision. That is a matter entirely up to the state. In the treatment of cattle against hemorrhagic septicemia we have offered to supervise that work. Of course, we cannot compel supervision except so far as the intrastate traffic is concerned, and I hardly feel the bureau is willing at this time to require vaccination against hemorrhagic septicemia.

I am inclined to think Dr. Cotton is in accord with that, and therefore I move that that clause be stricken out and then the resolution will stand to be adopted.

DR. COTTON: Personally, I feel the resolution should read that any vaccination done in stockyards, whether for hemorrhagic septicemia or any other disease, should be done under the supervision of the bureau.

DR. A. T. KINSLEY: The resolution doesn't signify compulsory vaccination. It simply requests that the vaccination be done by qualified veterinarians under the supervision of the bureau in order that that work might be done competently. As I listened to the reading it did not signify that all animals be vaccinated; it simply requested it be done in the proper manner.

PRESIDENT FERNEYHOUGH: To be perfectly frank with you, the Chair doesn't exactly catch Dr. Miller's amendment. I think perhaps you had better make it plainer, Dr. Miller.

DR. MILLER: If they are vaccinated at the public stockyards against hemorrhagic septicemia, how is it to be accomplished unless some regulation is promulgated? They are doing it now in a number of markets. There are no regulations on it. Here in Chicago where they have asked us to take charge of the work we are supervising the work, and other markets where they have not asked us to take charge we are not having any connection with it.

I may be a little dense but it would seem to me if there is any vaccination at public stockyards it would be the sense of the meeting that the Secretary should promulgate regulations. Of course, I understand the intrastate would still be left to whatever the state authorities decided should be done.

DR. CONNAWAY: I move that this resolution be laid on the table for this reason: In the minds of many sanitarians this is a question which is still in the experimental stage, and this seems to be sort of an adroit move to popularize vaccination. I don't know who introduced the resolution or who is back of it, but I know there are many of us who don't believe yet that this is a matter which has been settled yet, and that it is still in the experimental stage. I have personally vaccinated one-half bunch of cattle that were thought to be affected with this disease and left the other half without vaccination. Those who were sick with the supposed disease were put under good care, and all recovered except two. These showed the hemorrhagic
lesions such as we see in the cases called hemorrhagic septicemia. For that reason, I think we ought to go a little slow about involving the federal government or using them in a way to carry out the aims of commercial biological houses.

PRESIDENT FERNEYHOUGH: It occurs to me that this has been moved to be laid on the table. I suppose, according to parliamentary rulings, that is to be acted upon.

The motion for tabling the resolution was regularly seconded and carried.

DR. COTTON: I agree with Dr. Connaway relative to hemorrhagic septicemia, but I do feel this body, at this time, should take some action on the vaccination of live stock in public markets before they are allowed to be shipped out, particularly intrastate, and that all of those vaccinations should be supervised by a federal inspector.

I stated on the floor yesterday or day before that the commission men in the stockyards are inclined to accept some of these vaccinations as insurance to protect their business. The biological houses are glad to sell the products. I am sincere in the belief that such methods or procedures should be supervised if allowed to do under any conditions.

PRESIDENT FERNEYHOUGH: It appears this motion is ended, so far as that is concerned, because it has been laid upon the table.

DR. MILLER: I am not in position to take any action here but it can be opened for reconsideration. I doubt if anybody knows the situation.

PRESIDENT FERNEYHOUGH: I think the proper way, if you want to do it, is to take it from the table by vote.

Dr. Malcolm, didn't you have a committee report?

DR. P. MALCOLM: As you know, you have a Committee on Inter and Intrastate Movement of Swine, and have had it for some time. From year to year we have reported, and your association has taken action. This year, due to the fact that the chairman of your committee was tied up with foot-and-mouth disease in California, your president assigned that labor to me, and I attempted to prepare a report.

Your Committee on Foot-and-Mouth Disease adopted a uniform rule and regulation of the character that is embodied in this report. We as a committee believe that the action this association took in regard to having uniformity of rules and regulations governing interstate and intrastate movement of live stock is really better than the one we attempted to bring forth in this report. I don't know as it would be absolutely necessary for me to read this report, but if this association would like to have the report read I will be glad to do it, with the understanding that the portion of this report which pertains to the uniformity of inter and intrastate movement of live stock be considered as being absorbed by the regulation adopted by this association, presented by the committee on the regulation governing the control of foot-and-mouth disease.

In order to substantiate the actions of this association, the history of this committee and your action on all of the reports they made
showed the sense of this association was along the lines that our state regulation should be in uniformity with the United States Bureau of Animal Industry regulation. It may be past history to you people. You may have forgotten what action you have taken or did take. I am sure you know what action you took at this meeting, and it might be well for me to read this report showing definitely that this association has from year to year done good work in trying to bring together a uniformity in the rules and regulations with the different states. This association, as I have said before, has put the cap sheaf on it, so for your information and with your permission I will read the report.
REPORT OF THE COMMITTEE ON INTER AND INTRASTATE SHIPMENT OF SWINE.

Your committee on inter and intrastate shipment of swine has the honor of submitting to the association the fourth annual report. The first report being given at the 1920 meeting.

This report included a draft of regulations for the consideration of the association. Action on the report was deferred until the next meeting. The second report was submitted to the 1921 meeting, but action was again deferred until the 1922 meeting with the result that the report with some minor changes was accepted. The committee was continued in order to ascertain to what extent, if any, the states had been influenced by the association to modify their regulations in the interest of uniformity. At the 1923 meeting the committee reported data showing the number of states that had modified their regulations to conform with the regulations adopted by this association, which was published in the 1922 report.

This report was accepted by the association in the face of the facts shown that a very small per cent of the state sanitary authorities were adopting the regulations prescribed. The association indicated its favorable attitude toward the matter of uniformity in state regulations controlling the movement, not only of swine, but of all live stock, by continuing the service of the committee.

We need not spend any time going into the past of live stock sanitation, because it has no past. Go back, if you will, to the days of Moses and you will be surprised to learn how much he knew about live stock sanitation. Perhaps his knowledge was not based on scientific principles, but he had the best kind of common sense, and the principles which he laid down in those early ages are being, to a considerable extent, followed today.

The innumerable facts derived from many years' observations by the highest veterinary authorities and those who have most attentively studied the etiology of infection are unanimous in their opinion that disease control must be done in a uniform and united method. This has been demonstrated a great many times in controlling and eradicating foot-and-mouth disease from the United States.

The inaugurating of government control is the big factor in disease control, but there is much more required in the matter than government control, than we have at the present time, which is uniformity in state regulations. If our government regulations are adequate, sound and there is no question but what they are, for they have stood the test for thirty years or more and have never failed, why is it not advisable and is it not good judgment for a state to use the principles embodied in the regulations adopted by the United States Bureau of Animal Industry as a foundation in the drafting of state regulations in the matter of live stock sanitary control work?

Is it not a duty rather than a matter of taste to see that state and bureau regulations are uniform, and that they are properly and intelligently enforced?
It is recognized and admitted that each state has the right to promulgate such regulation as it deems necessary to meet its conditions and to protect its live stock industry. Transportation officials, officers of live stock associations, and shippers have criticized severely the variations in the quarantine regulations adopted by the different states in the recent outbreak of foot-and-mouth disease in California. In connection with this, the committee wishes to submit to the association a letter received from G. W. Luce, a representative of the Southern Pacific Railroad Company, relative to the difficulties they encountered in their efforts to meet the quarantine requirements of various states during the recent outbreak of foot-and-mouth disease in California:

Dr. U. G. HOUCK,
Inspector In Charge,
U. S. Department of Agriculture,
Bureau of Animal Industry,
1015 L Street, Sacramento, Calif.

Dear Sir:

Referring to your letter of October 27th, and our conversation some time ago, having to do with a lack of uniformity in the state quarantine regulations affecting live stock and other commodities:

It is noted that your letter requests a statement giving our views, and detailing some of the conditions we encountered in connection with the movement of live stock during the recent foot-and-mouth epidemic.

The different states issuing quarantine regulations against California on account of the foot-and-mouth disease were almost identical in the matter of live stock, prohibiting, in general, all species; therefore, the difficulties encountered in this respect were minimized, but our greatest troubles were encountered in the transportation of other commodities, and, in order that you may be acquainted with them, will quote some of the different instances:

1. One state condemned two carloads of fruits and vegetables that were shipped from a clear area in California on account of 25 crates of bananas in the cars being packed in banana leaves. The bananas originated in South America and were in the original crates.

2. One state required disinfecting all cars containing commodities from California, irrespective of their nature. This notwithstanding, the infections were several hundred miles from the border line of this particular state. As an instance of the hardship that this worked it was necessary to furnish disinfected cars to move cement from a plant 500 miles distant from point of infection. In taking up with the state issuing the quarantine, the State Health Officer advised that it was not necessary to furnish disinfected cars, whereas the State Quarantine Officer advised that cars would be turned back unless they were disinfected. This order necessitated disinfecting clean box cars for sugar loading, and, as sugar is a commodity which will absorb odors, it required lining the cars with several thicknesses of heavy paper, which operation was very expensive.

3. One state's quarantine provided that glass packed in straw could not be shipped from California notwithstanding that affidavits and certificates would be attached showing that the shipment originated in
Europe, or the Atlantic seaboard, and was not repacked in California, and merely handled through the shipper's warehouses, the latter being in clear area. This also put the duty of inspecting the contents of cases on railroad agents to see that excelsior, paper or some other packing was used.

4. Another state's quarantine prohibited the movement of all commodities from infected counties. In San Francisco, for example, the infection was confined to the stock yards on the outskirts of town, but, on account of the quarantine, all shipments were stopped from San Francisco to this particular state. The wharves, docks, warehouses and shipping places in the commercial district of San Francisco are located several miles from the stock yards, and no cattle, hogs, sheep or animals likely to carry contamination, traverse the commercial district.

5. Another quarantine provided that beans, sugar and rice could not be shipped from clear areas in California for the fear that the commodities would be contaminated by birds or pigeons carrying the infections in the warehouses. This regulation made effective notwithstanding the warehouses were located several hundred miles from the infected area.

6. One state required cars containing fruits and vegetables be fumigated, even though from clear area. The intervening state prohibited the transportation of fruits and vegetables absolutely. Cars en route to the first state were refused entrance on account of not being fumigated, and the intervening state would not permit diversion or unloading within that state.

7. Imported chinaware through the ports of California is generally packed in straw. Shipments in cases or boxes with this packing were refused entrance to a number of states, making it necessary for shippers to repack their articles, and placed a further burden on the carriers' agents to inspect the packing.

8. One state's quarantine prohibited fruits and vegetables that were grown in California and placed an interpretation that rice was a vegetable, but if the rice was grown in China, Japan or some other state it would be permissible to ship. It was impossible for railroad agents to differentiate between California grown rice and rice grown in other states or countries.

9. Advice was received that butter was moving via parcel post from an infected area to a state issuing a quarantine against the transportation of this commodity, which placed the railroad agent in an embarrassing position in that he was compelled to refuse the shipment for freight but could accept it for transportation via mail.

10. Household goods, other than emigrant movables, were prohibited by one state, which had the effect of stopping the movement of practically all second-hand furniture, etc., from all parts of California.

11. Canned milk and canned meats were prohibited by one state, notwithstanding that it was generally accepted that these two commodities are classed as sterilized products.

12. Another quarantine prohibited transportation of cement in second-hand sacks. How is a railroad agent to determine whether sacks are second-hand or new after car has been loaded?
13. One quarantine prohibited fruits and vegetables destined that particular state, but required advice of every shipment passing through that state destined to points beyond, which necessitated a very large number of telegrams and letters. The value of this has never been determined.

14. Another quarantine prohibited dried fruit and beans that had not been in storage six months. This placed the burden on the railroad agent to know the details of practically every man's business. A very large number of the quarantines required certificates, affidavits and other evidences that resulted in overburdening all departments of the transportation companies with details, the value of which we have never been able to determine.

15. Another quarantine provided that dried beans, sugar and rice, onions, coffee, flour and dried fruit could be shipped if these commodities had been in storage since the crop was first harvested and placed the burden on the carriers' agents to so determine. This was quite impossible of execution.

16. The quarantine of one state prohibited "live stock and materials" the vagueness of this is very apparent.

17. One state accepted roasted coffee in cans packed in boxes but prohibited the same article when it was packed in wooden drums.

18. One state prohibited the entrance of performing bears that were traveling in the vaudeville circuit even though it had been fully explained that these animals were always in cages or performing on theatrical stages, were not in contact with any other animals when not in cages. Hay or straw was not used as bedding, and would be properly disinfected by recognized authority.

19. One quarantine prohibited garden and farm seeds unless same were last year's crop and in storage since harvested. It will be appreciated that a railroad agent cannot keep track of all these details.

20. Car of railroad ties from a lumber mill in the extreme northern part of California was turned back at the border line of another state on account of the car not being disinfected. This resulted in a lot of needless transportation, and delayed the shipment materially.

21. A wild animal dealer in San Francisco imported from India some monkeys and leopards which were sold to animal circuses in the middle west and eastern states. These animals were brought in in cages and there kept; were not in contact with other animals and assurances were given that certificates would be furnished by the state of California authorities and the federal authorities as to their cleanliness; notwithstanding these assurances permission to transport through different states was refused even though the cages would be in express cars and no litter thrown on the right-of-way.

Think the foregoing will be sufficient to illustrate the difficulties that were encountered during the time that the different states were issuing quarantines indiscriminately. The regulations were changed with such rapidity that it was quite impossible for an organization of the size of the Southern Pacific Company to be fully posted at all times in order to comply. More particularly is this true with respect to the carriers' agents, whose duties are such that time does not permit of their
reading, analyzing, studying, and complying with regulations, some of which comprise three closely printed pages.

The need for uniformity in quarantine throughout the United States is so apparent that it is hoped that the U. S. Live Stock Sanitary Association will give this subject its most earnest consideration. The multiplicity of the quarantines that were promulgated during the past year placed an exceedingly burdensome task on all railroad companies, that if they were not fully complied with it was not a willful or intentional action but rather a misunderstanding or an oversight, which is easily explained when consideration is given to the voluminous records it was necessary to search before each shipment was accepted.

Will be very glad to lend any assistance we possible can in bringing this about, and will appreciate advice from you as to the results of the meeting of the association in Chicago in December.

Signed: G. W. LUCE, F. T. M.

As before stated, we believe the different states should have the right to make quarantine regulations to protect their live stock, and further believe that they should, if not, be invested with that power. But in order to avoid any unnecessary drastic quarantine, would suggest for your consideration the feasibility of an organization to help direct the efforts of the states to protect themselves so that there would be no possible danger of spreading infection and to conform with the B. A. I. regulations.

It appears possible that an organization could be perfected by dividing the United States into four regions: First, the western states; second, the middle western; third, the eastern; fourth, the southern. The conditions in the western states are similar. The same can be said of the middle western section and also of the eastern and southern sections.

We suggest that the United States Live Stock Sanitary Association appoint a committee composed of the representative Live Stock Sanitary authorities in each of these sections of the United States to be known as regional committees.

So that when an outbreak of foot and mouth disease or other foreign destructive disease makes its appearance in the United States the regional committee could meet in their respective sections with representatives from the various states in order to discuss and decide upon regulations that should be put into effect to protect the interests of the respective sections should it be found advisable to promulgate any regulation in addition to the federal regulations that exist at the time. With committees of this kind it appears that a great good could be done to establish uniformity of regulations throughout the country.

P. MALCOLM,  
U. G. HOUCK,  
H. A. WILSON.

DR. MALCOLM: I move the adoption.

The motion was regularly seconded and unanimously carried.

PRESIDENT FERNEYHOUGH: Are there any other committee reports?
DR. COTTON: Mr. Chairman, I have a resolution I would like to present pertaining to the resolution that was laid on the table a few minutes ago.

"RESOLVED, That the United States Live Stock Sanitary Association now in session recommends that all vaccination of live stock in public stockyards be done only by qualified veterinarians and under the direct supervision of the Federal Bureau of Animal Industry."

This does not make it mandatory or suggest that the Secretary promulgate regulations for vaccination, but if any vaccination is done in the stockyards it must be done by qualified veterinarians and under the direct supervision of the Animal Bureau Industry. I move its adoption.

MR. J. H. MERCER: The gentleman is out of order. He cannot present a matter of the same subject in connection with a tabled subject. Therefore, the only way we can proceed with this subject is to take the resolution from the table.

PRESIDENT FERNEYHOUGH: I think the point is well taken. I believe Mr. Mercer is right. It is practically the same resolution.

DR. COTTON: I move you that the tabled resolution be taken from the table at this time.

MR. MERCER: Did the gentleman move for or against the resolution?

DR. COTTON: I voted against the resolution.

MR. MERCER: He has no right to make the motion.

DR. LAMB: I move that the resolution be taken from the table.

(The motion was regularly seconded and unanimously carried.)

Be It Resolved, That the U. S. Live Stock Sanitary Association recommends that all vaccination of live stock in public stockyards be done only by qualified veterinarians and under the direct supervision of the U. S. Bureau of Animal Industry.

DR. COTTON: I move the adoption of the resolution I have just read in lieu of the resolution that was just removed from the table.

(The motion was regularly seconded and unanimously carried.)

PRESIDENT FERNEYHOUGH: Are there any other Committee reports?

(The report of the Legislative and Tick Eradication Committees were read by title.)
REPORT OF THE LEGISLATIVE COMMITTEE.

Through the initiative of the Committee on Legislation, arrangements were made with the Chairman, Sydney Anderson, of the Subcommittee on Agriculture of the House Appropriations Committee for a hearing before that committee on February 8, 1924. This hearing was attended by members of the Committee on Legislation and a number of other representative men from the various states, all of whom gave testimony concerning the progress of tuberculosis eradication in the states and the need of a larger federal fund to meet the demands of increased work. Our delegation was given a most respectful hearing and ample time was allowed by the Chairman of the Appropriations Committee for the giving of testimony. A keen interest was manifested by the members of the Appropriation Committee in the facts presented by the members of our delegation. We urged an increase in the federal fund of $400,000, which increase was later recommended by the Appropriations Committee, after which this increase was voted by the House and Senate. This gave a total federal fund of $3,250,000 for tuberculosis eradication during the fiscal year beginning July 1st, 1924.

As the states have for this fiscal year a total of approximately $6,000,000, and counties a total fund of approximately one million and a half for tuberculosis eradication, the grand total including the federal appropriation is now considerably in excess of $10,000,000, the greater part of which fund is used for indemnity purposes.

The present administration at Washington is very determined to decrease governmental expenditures of all kinds, and the Director of the Budget cut materially the recommendation of the Secretary of Agriculture for tuberculosis eradication during the next fiscal year beginning July 1st, 1925. Your chairman was notified of this cut by telegram from the office of the American Farm Bureau Federation at Washington several weeks ago. We have brought this matter to the attention of a number of men throughout the country and this cut has recently been restored. The indications are that the appropriation for the next fiscal year will be the same as it has been this year. The general sentiment in Congress is that states and counties should assume a larger portion of the cost of testing cattle and paying indemnity on reactors slaughtered. As the county is the unit in area work and as the people living within an accredited county are the chief beneficiaries, it would seem only fair that the county should provide a very considerable part of the funds which are required to complete the testing and to maintain an accredited county. Enough federal and state funds, however, should be provided to serve as a nucleus and an incentive to the extension of area work. It is also important that sufficient federal and state funds should be made available to insure respect on the part of local organizations for the federal and state system that has been carefully worked out and has proved effectual in coping with this problem. The eradication of tuberculosis is national in scope. The success of this work in the main-
tenance of clean areas in one state is largely dependent upon the thoroughness of the work in neighboring states. It would seem, therefore, that while the counties are likely to assume in the future a larger portion of the expense of tuberculosis eradication, there should be continued a liberal allowance from the federal and state governments to make it a strictly cooperative enterprise properly guided by men with broad training and experience.

Respectfully submitted,

H. R. SMITH, Chairman.
Friday Morning, December 5, 1924.

REPORT TICK ERADICATION COMMITTEE.

In submitting this report on tick eradication, your Committee on this subject again desires to call your attention to the fact that this United States Live Stock Sanitary Association was primarily organized for the purpose of aiding in eradicating the Texas fever tick. During the past several years, however, this Association has so materially increased in membership that their live stock sanitary problems have apparently become more important in consideration of tick eradication than its place on the program, and thus interest originally displayed is disappearing.

This report as result of tick eradication in the ten Southern States, wherein infestation still existed up to December 1, 1923, covers the progress, setbacks, etc., in connection with tick eradication during the current year of 1924.

Alabama—With a total of 67 counties originally in quarantine on the inception of tick eradication up to December 1, 1924, demonstrates the following results:

59 counties released, 8 counties in quarantine.

Arkansas—Total of 75 counties originally infested up to December 1, 1924, demonstrates the following results:

38 counties released up to December 1, 1924, 37 counties still in quarantine.

Florida—Total of 50 counties originally in quarantine and wherein no extensive tick eradication has been conducted during the past year, results as follows:

5 counties released from quarantine up to December 1, 1924, 53 counties in quarantine.

Georgia is to be congratulated upon the most excellent work that it has accomplished in satisfactory eradication of the cattle fever tick during the current year. Out of 157 counties originally infested the entire state, up to December 1, 1924, is released from quarantine, the last 4 counties in which systematic tick eradication has been conducted during the current year having been satisfactorily completed.

Louisiana—Total of 65 counties originally in quarantine has but 27 counties released, 38 counties in quarantine. I am sorry to call the attention of this Association to the unsatisfactory results, as manifested in this report, in Louisiana. This is due to a combination of conditions over which the co-operating authorities had no control, principally depression in price of cattle and inability of the counties involved to raise sufficient funds to carry on the work.

Mississippi—81 counties, all of which were in quarantine originally upon the inception of tick eradication up to December 1, 1924, shows 58 counties released from quarantine, 23 counties still in quarantined area.

North Carolina—75 counties originally in quarantine up to December 1, 1924, has succeeded in eradicating ticks from 68 counties, leaving but 7 quarantine counties within the state.
Oklahoma—61 counties have succeeded excellently in the tick eradication project and up to December 1, 1924, shows a total of 56 counties released with but 5 still in quarantine.

South Carolina—With a total of 44 counties, has but 2 counties now in quarantine, 42 having been released.

Texas—With a total of 199 counties, has successfully eradicated ticks in 101 counties, leaving still 98 in quarantine.

This report demonstrates excellent results in most of the states wherein tick eradication activities are being energetically conducted as a co-operative project in conjunction with the state sanitary authorities and the United States Bureau of Animal Industry, while some of the others do not look very well as submitted on paper. However, as stated above elsewhere in this report, a combination of circumstances, together with other ulterior conditions, have temporarily militated against a more extensive eradication campaign, but by no means indicates a cessation of combined efforts. In many instances it may be stated throughout the Southern States, engaged in tick eradication, that ineffective laws that prevent proper enforcement is one of the causes of the setback, while in others lack of proper appropriation to carry on extensive tick eradication in the proper manner, together with errors made in attempting to cover too much territory at one time. In Louisiana we are fast reaching the conclusion that a definite appropriation biennially made, commensurate to carry on in a business-like way this work, is necessary together with proper control of cattle and systematic or definitely established zoning system. We are further of the opinion that in a good many of the states counties have been released from Federal quarantine prematurely. We mean by this that where counties are released from Federal quarantine and wherein, nevertheless, infested premises and cattle existed, it has been very difficult not only to clean up such infested centers, but to subsequently receive from the hands of the local officials and cattle owners the same interest and co-operation.

As a recapitulation in tick eradication involving the ten Southern States wherein tick eradication has been conducted since submission of the last report before this Association, December 1, 1924, it will be noted that out of 882 counties originally infested in the ten states involved, 611 counties have succeeded in the project and are now released from quarantine, leaving a total, in the ten Southern states of but 271 counties to complete the entire project, thus two-thirds of the entire tick infested areas are on the clean or released side in the eradication of the Texas fever tick.

Respectfully submitted,

E. PEGRAM FLOWER,
Chairman Tick Eradication Committee.
PETER F. BAHNSEN,
WM. MOORE,
J. H. BUX,
W. K. LEWIS,
J. BOOG-SCOTT,
C. A. CARY,
Members Committee.
PRESIDENT FERNEYHOUGH: I am sorry to say I can no longer persecute you. I have certainly enjoyed being with you. It is now in order, I believe, to elect officers. The first officer to be elected is the President.

DR. VAN ES: Mr. President, I realize it is a very difficult matter to find an ample successor to our worthy President of this section, yet I feel constrained to place in nomination a man who has been faithful in attendance in this organization, who is a staunch worker for the advance of live stock sanitation, and who really needs no introduction. I nominate Dr. McNeil of New Jersey. (Applause.)

DR. MALCOLM: Mr. President, it is with pleasure that I second the nomination of Dr. McNeil from New Jersey, for the reason I think if there is any man who can follow the footsteps of our worthy President, it is Dr. McNeil. You will notice they are built about alike.

PRESIDENT FERNEYHOUGH: Are there any other nominations?

DR. MAYO: If there are no other nominations, I move that the nominations be closed and that the Secretary be instructed to cast a ballot for the Association in favor of Dr. McNeil for President the coming year.

(The motion was regularly seconded and unanimously carried, and the Secretary cast a ballot for Dr. McNeil as President.)

PRESIDENT FERNEYHOUGH: I believe we have five Vice-Presidents to elect, according to our by-laws. It is now in order to nominate Vice-Presidents.

DR. KIERNAN: I would like to nominate Dr. Lincoln, State Veterinarian of Tennessee.

The nomination was regularly seconded and unanimously carried.

DR. W. T. SPENCER: I would like to nominate Dr. Van Es.

The nomination was regularly seconded and unanimously carried.

DR. BARDEN: I nominate Mr. Mark R. Thornburg, Secretary of Agriculture, State of Iowa.

The nomination was regularly seconded and unanimously carried.

DR. CONNAWAY: I nominate Mr. Boog-Scott, of Texas.

The nomination was regularly seconded and unanimously carried.

DR. MALCOLM: I would like to place in nomination Dr. Hart of California.

The nomination was regularly seconded and unanimously carried.

PRESIDENT FERNEYHOUGH: The next in order is the election of our most important officer, Secretary and Treasurer.

MR. MERCER: Mr. President, one of the pleasures I have in attending this meeting is to present the name of the Secretary that has meant something to this Association. I rise this morning without taking up any time in eulogizing this Secretary and place in nomination Dr. Dyson.

DR. FITCH: It gives me great pleasure to second the nomination. Being secretary of a good many organizations, I know exactly the work
which Dr. Dyson has been able to do for this Association, and this Association owes Dr. Dyson a very great vote of thanks for his work which he has so successfully consummated for the benefits of this Association.

DR. MAYO: I am sure there is no one here that wants to run against Dr. Dyson and I am sure no one else will be nominated; therefore, I move that the President cast the unanimous vote of this Association for Dr. Dyson as Secretary and Treasurer for the coming year. (Applause.)

The motion was unanimously carried.

PRESIDENT FERNEYHOUGH: Gentlemen, as President of this Association it gives me the greatest pleasure to cast the vote of this assembly for Dr. Dyson. I worked with him during the last year.

When I was a kid I used to get spanked. I won't tell you how many spankings I got because I can't remember them all, but one thing, among others, they used to do was lock me up when I misbehaved.

Last year when I was in Des Moines I saw a man who looked very lonesome. He said he didn't have any room, so I invited him into my room. That was Dr. Dyson. About two o'clock in the morning there were some sick members in another room who needed Dr. Dyson's attention. Evidently the medicine was rather scarce and wouldn't go around, so they phoned. They didn't want me but wanted Dr. Dyson. Dr. Dyson got out of my room and very carefully locked the door and put the key in his pocket and left me locked up in the hotel, so I shall never forget him. He is very attentive to his duties. (Laughter.)

It is a matter of record, gentlemen, what Dr. Dyson has done for this Association. I tell you this thing of financing things, if you have a family, means something. Dr. Dyson found us in trouble financially and he has lifted us out, and I congratulate the Association on re-electing Dr. Dyson as Secretary and Treasurer.

I will now appoint Dr. Mohler and Dr. Van Es as a committee to escort our new President up to the platform.

Dr. Mohler and Dr. Van Es escorted Dr. McNeil to the platform.

PRESIDENT McNEIL: Little boy, I give you my right hand.

Dr. McNeil took the chair.

PRESIDENT McNEIL: Gentlemen of the Association, I assure you I appreciate the honor, and I hope the confidence you have reposed in me will not be misplaced.

I realize there is a task ahead and I shall rely upon all of you to render the assistance which I know you will give to make the meeting for the coming year a success.

SECRETARY DYSON: Before we adjourn, I want to announce there are a number of application forms in the smoking room, and I would like to have as many as possible take two or three application forms; see that they are filled out and returned promptly.
I have enjoyed the hearty co-operation of every member of the Association during the past year. If you will just continue to add your co-operation and assistance we can get the membership of this Association back to where it was a few years ago, and that will assure the financial success of the organization. I thank you.

MR. MERCER: I would like to make a little inquiry as to provisions made for paying Dr. Dyson, or furnishing him with money to employ help. What is the rule, Doctor?

SECRETARY DYSON: There isn't any rule and there doesn't need to be any. I assure you it is a pleasure to serve this organization to the best of my ability. Fortunately, I have been able to do the clerical work myself during the past year and I hope to be able to continue. The only expense possible in connection with my administration of office would be railroad transportation. I expect to charge that up to the Association.

MR. MERCER: I would also suggest that $100 or $200 be put at your disposal to employ help. This Association appreciates your work, but they want to take care of the necessary things needed, as well.

SECRETARY DYSON: If I get in a pinch I will employ what help is needed and present the bill to the Association.

MR. MERCER: That will be all right.

PRESIDENT McNEIL: If there is no further business, the meeting stands adjourned.

The meeting adjourned at twelve o'clock.

Adjournment.