Report of the Proceedings

of the

TWENTY-SEVENTH
ANNUAL MEETING

of the

UNITED STATES
LIVE STOCK SANITARY
ASSOCIATION

CHICAGO
December 5th, 6th and 7th, 1923
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BY
UNITED STATES LIVE STOCK
SANITARY ASSOCIATION
ANNOUNCEMENT.

At the close of the twenty-seventh annual meeting of the Association, your secretary confidently expected to be able to issue a report of the meeting within the next sixty days. Failure to realize my desire was due to the sudden death of Mr. M. J. Brady, who had reported the minutes of the annual meetings for many years. Every possible effort was made to find someone who was able to decipher Mr. Brady's notes without avail. Consequently, it has been necessary to publish the papers presented during the last two days of the session without reference to the discussion following the presentation of the various subjects. With this explanation, I trust that the cause of the delayed issue of this report will not be charged to negligence on my part.

O. E. Dyson, Secretary-Treasurer.
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Report of the Proceedings
of the
Twenty-Seventh Annual Meeting
of the
United States Live Stock
Sanitary Association
Chicago, Illinois, December 5th, 6th and 7th, 1923.

The meeting was called to order at 10:00 o'clock A. M., December 5th, 1923, at the Hotel LaSalle, Chicago, Illinois, President W. J. Butler presiding.

President Butler: Gentlemen, the 27th Annual Meeting of the United States Live Stock Sanitary Association will please come to order.

We are particularly fortunate this morning in having Mr. Gore of West Virginia, Assistant Secretary of Agriculture, with us, who will address us on subjects of interest to you. Mr. Gore. (Applause.)

ADDRESS BY MR. GORE:

Mr. President and Gentlemen of the Society: I am not here, as the Doctor has said, to make an address. I was in the city and I thought, realizing the many benefits that myself and my neighbors have long since enjoyed and profited by having as the results of the efforts of such Societies as this, and particularly of this Society in the Live Stock industry, that when I heard that your Society was in session I thought that I would like to come and pay my respects to you in appreciation of the benefits that myself and neighbors had received in a local way, and as an official of your government, to pay my respects to you in that capacity as well.

Not long ago I was talking with one of those clear headed, clear thinking, everyday working men. I talked with him about his wages and about his advantages and about the organization of which he was a part. I discussed with him some of the disadvantages of the organization of which I happened to be a member at that time. I particularly referred to agriculture, and he said, "Do you know, Mr. Gore, that I used to draw a certain wage, and I thought it was very fair. I saved along and finally succeeded in paying for my home. Today I receive quite a larger wage, but I have lived long enough to know and to understand that the pay check in my pay envelope does not begin to represent that which my country yields me and affords me. When my children go down to the school their little eyes are examined, the little teeth and the little bodies are examined, the water and all those things that enter into their lives is cared for by bright men, and by reason of the efforts of men to whom I have
never contributed one cent," and he said, "Do you know that when I come to think about it, the most that life has yielded me is not in the pay envelope but in the opportunity to be a part of this society in which we live, thereby co-ordinating and consolidating and contributing our efforts to the general uplift of our plan of life and the fullness and enjoyment of life? Out of that I think I get most of my pay."

And it is societies such as this, both by your individual efforts and more particularly by reason of the fact that you have co-ordinated your efforts that you have made your influence felt in practically every home in the land.

A few days ago when I was appointed Assistant Secretary of Agriculture I desired to go around and visit the departments. Well, you know I have been a real dirt farmer; I have been in Washington long enough to get the tan off of me, but I have not got the humidity out of my system that naturally goes along with the average farmer. So I decided to go around and call on the various folks in the department, and find out what they were doing, and Dr. Mohler told me they should come and call at my office. That was all right, I did not know anything about that formality, but what I wanted to get was this: I wanted to understand the real purpose and the real heart throb behind each division of the department of agriculture; I wanted to know the sentiment behind it; I wanted to know that which inspired them in their various activities.

And so I started out. I did not get very far, but I am going to take you just a little way on that trip. I did not go over, as I say, to Dr. Mohler's department, because Dr. Houck had not finished coaching me in how to ask him embarrassing questions in regard to that department.

But just as soon as I got fixed up I went down into the flower garden and the old gardener was very deaf indeed. His son had to talk to him and introduce me, and I told him I just came down to pay my respects to him, and I said, "I wish you would just tell me what keeps you interested in your work and what makes you feel that you are really contributing a part to the undertakings of the Department of Agriculture." So right away he took me into the rooms, the hot houses, and took me over and showed me one of the most beautiful little yellow roses I think I have ever seen, and he showed me a very beautiful little pink rose and he told me the story of those roses.

It seems as though a French scientist, a botanist and entomologist had lost his two sons in the Aviation Corps during the late war, and not wanting, not desiring that his sons be remembered distinctively in marble or in bronze, but desiring that they be remembered in a way that was promotive of the life of the nation to which they had sacrificed and for which they had sacrificed their lives, he conceived the idea of developing the two little roses, and he named one for each of his sons. And he started out with the idea of having those little roses planted in every flower garden in France, so that the memory of his sons when called up should call up and give pleasure and give happiness to the society that they had died in order that it might be promoted.
Well, he told me many other stories, but I got the heart throb of the man. He wanted, the old gardener, his heart was bent on making America beautiful, of giving to your home and to mine those things that you and yours and me and mine, no matter what their avocation, the happiness that comes in the beauty of flowers.

Well, I had a telegram from Senator Ralston and he wanted to know what I had done for the sugar folks. I give you this for what it is worth. I called some of the boys over from the Chemistry division and I talked with them and they said to me, "Why, yes, there are certain grades of cane syrup that if you do not reduce it to a certain point, it will ferment, and if you do reduce it it will crystallize." And so the boys went to work and they figured out a formula that put in the syrup at the right time prevented its crystallization and gave that particular commodity a much wider field.

And so are you contributing to the happiness and to the advancement and to the prosperity of very many homes.

You know one of the very essential things in any attempt at a co-operative work is standardization. It is not possible for those who do not properly standardize or do not properly prepare their commodity for market to be able to intelligently and helpfully co-operate with their neighbors, and so I wanted to know.

I went over into another division and they told me how they had worked out a government standardization and by co-operation with the states the fruit of certain sections now was being inspected both as to grade and to quantity, and that the certificate of the government was a good certificate and settled all questions of species and of quality the minute it was delivered f. o. b., and that it became a good piece of bankable paper at once, thereby enabling the person in New York or in London or Boston or elsewhere to buy largely of the commodities of the various farms and at the same time with a thorough understanding both as to the business and as to the articles sought the moment the deal was closed.

Well, that is far enough. I am not going to say anything to you about your activities in the live stock world. I simply pay my respects to that. You are more familiar than myself with it. You have benefited no more than I, but it is to that spirit that causes you to assemble, to come long distances from your homes, each individual contributing, his individual effort in this particular line of work and then bringing the result of it here for the survey and suggestion and it is to that spirit, gentlemen, that I am happy this morning to pay my respects to you in the name of your Department of Agriculture.

When I came from the mountains of West Virginia I had an idea that only those of us who had most on our backs and hayseed in our hair were the everyday common people of this country. Gentlemen, wider contact soon causes you to realize that the real common people of this country are not determined either by race, creed or station in life, or whether you have or do not have wealth. But the common people of this country are those who hate ignorance, who hate untidiness and injustice and the conditions that are conducive thereto, and whose approach to their daily life and daily
undertakings in this community, or their industry or profession, of which they are a part, enriches that community and promotes by their activity the welfare of the nation as a whole. And if I have learned nothing else in my sojourn at Washington I have learned to understand that no class, no group have any monopoly of the right to call themselves the backbone of this country.

Dr. Butler, I just got up here to pay my respects and I am going to talk just a minute or two longer with your permission.

Gentlemen, we hear a great deal about the condition of the country. Many men would lead you to believe it would only take just a little push to push it over; many men would lead you to believe that we are on the verge of some sort of revolution. I have learned since I have been with the Department of Agriculture that that is not true, for after Magnus Johnson and myself and others have finished our talk there is still left underneath that power that comes from permanent advancement and established good and worth that has been accumulated, to which men of societies such as this have contributed.

And while the farmer is trying to produce a better and more standard article of food, and while you men are working in your capacities and other men are carrying on their activities, there is so much good, and there is so much of power, and there is so much of worth, and there is so much of that which endures because of its intrinsic worth, that it makes laughable many of our fears.

I remember not long ago I was at a place that a man was discussing the problem of labor and the danger from labor, and while he was discussing the fact that the laboring ranks were so filled with very many nationalities that had not yet an exact conception of our scheme of government, and all that, the man said in my presence, "Well, during the war there was not anybody but American labor employed down around the factories and about the bridges and places where it would be easy by the discharge of half a dozen or more bombs to practically put us out of commission for quite a period of time during the war," and he said, "I want to call your attention to the fact that there was a time when we had possibly five or six million folks whose kindred and whose former associates were giving up their lives by the thousands, it was not a time when life was held dear, life was cheap, you and I were not down about the factories, it is true we had guards and all that, but what rendered the situation safe was after all by reason of the public schools, by reason of the wholesale contact with those immortal teachers, by reason of the very things that the American society has contributed to the world, by reason of those things that capital itself has contributed, by reason of the services that this Society and its members have contributed." and labor back in its heart is sound, to the core. Those six or eight or ten or twelve or fifteen or twenty-five bombs were never exploded.

And so there is the cure of the ills of the nation, it is in just such efforts as these, and I hope, gentlemen, at this day and time, when we hear so much of co-operation, that those of you that have had larger advantages will co-operate and help in part those who have not had such wide opportunity to observe. that you will help to bring to those who seek
to co-operate in the various lines of activity and particularly in agriculture, that you will help us learn the lesson that co-operation is not a patent affair that belongs to any particular group, but that statesmanlike co-operation is that co-operation which seeks to co-ordinate and to solidify and to interest in and give momentum to all of the important factors that may promote the end to be sought.

I was very much amused down at the Live Stock Show last night when the boys and girls' club paraded. A few years ago when I was up here it was quite common to hear the expression that we give more attention to our hogs and cattle than we are giving to our boys and girls. Well, after I had watched that parade I leaned over to Tom Wilson, and I said, "Mr. Wilson, you fellows here in Chicago like to show that you are giving some attention to the boys and girls of the country at this time," and so we are going to have a more intelligent, I mean a better informed, not a better hearted people, not a better intending people, not people of better intentions, but people capable by reason of their superior training of greater accomplishment in a given length of time, and when great radios give tongue to the information gathered by societies such as this and by the Department of Agriculture and other kindred activities of the government and others, we are going to have a rural population that can utilize to a higher degree than those of us who belong to the old school.

I hope, Mr. President, that you will pardon my somewhat unexpected intrusion on your program, but I felt, sir, that I would like to pay my respects to you, and for imposing myself upon you both as an individual and as a representative of your government.

It was not necessary for me to come. Dr. Dyson and Dr. Mohler both said that I might come, and they looked at me with that peculiar look that only a mountaineer likely detects what it means, and they said they thought it would do me good, and it has, to pay my respects, and I hope you will permit me to listen to your exercises such time as I may have.

You know Dr. Mohler reminds me a great deal of one of our old characters over home, and Betsy Reynolds. And Betsy was sort of a councillor and guide for the whole community; she was not a person of great wealth or anything of that kind, but she seemed just to be able to always meet a situation and she could go into a home disordered by sickness and distress and bring order out of chaos with less noise and confusion than any person I had ever known, and we all felt, with wholesome respect, that when Aunt Betsy told us to do this, that or the other thing, that that was the law of the community. So one day my mother sent me out, when I was a little child, to call to one of the boys coming down the road from a neighboring family that was in quite a distressed condition, to inquire how they were, and I did, and the boy replied, "Aunt Betsy is up at our house now." Well, that satisfied me, and thought that was all that was necessary to communicate to me and so I went back into the house and mother asked me what was the result, how they were up at Arthur's, and I replied, "Aunt Betsy is up at their house now." Well, mother didn't ask me anything more. That seemed to satisfy mother. Of course, I did not realize it, it seemed as though if Aunt Betsy were there everything was being taken care of. And so those of us over at Washington feel that with Dr.
Mohler and his magnificent staff here that your government will do its duty in the duties that have been imposed upon it by your country and the authorities thereof, and my respects to you. (Applause.)

PRESIDENT BUTLER: Mr. Gore, we consider that it has been a privilege and an honor to listen to you this morning, and we realize now the reputation that you have of being able to co-ordinate the work of the Department of Agriculture and to be able to bring out that which is good in individual men as well as individual desires; we feel that it is men of your caliber that are the backbone, or rather that strengthen the backbone of this country, and we thank you for your delightful address.

The next on the order of business is the roll call.

A MEMBER: I move we dispense with the roll call.

PRESIDENT BUTLER: It is regularly moved and seconded that we dispense with the roll call. All in favor say aye. Contrary, no. The ayes have it. The next order of business is the reading of minutes.

A MEMBER: Mr. Chairman, I move we dispense with the reading of the minutes and accept the Annual Report in lieu thereof.

PRESIDENT BUTLER: It has been regularly moved and seconded that we dispense with the reading of the minutes. If there are no objections it is so ordered.

The next order of business is unfinished business. Is there any unfinished business? If there is no unfinished business we will proceed with the President’s address.

Before proceeding, however, I want to remind you that we have a long program and it is a wonderful program, the Committees are to be congratulated on getting out such a good program, but it is going to mean we have to start on time. Now, we are going to start on time if there is only four or five in the room, and I particularly request that we try to be here on time.
MEMBERS OF THE U. S. L. S. A.:

It is customary, and no doubt it is pertinent, that your president should make an address dealing with matters of interest to your Association. Not that his ideas or his opinions are to be accepted without question. We trust that addresses and papers delivered to the U. S. L. S. A. will ever bring out a vigorous and instructive discussion.

Purpose of the Association

The committee on policy will report at this meeting, so it is not necessary for me to discuss the policy of this Association. Sufficient is it for me to remind you that, even though the purpose of the Association is written in our constitution, that there are several fundamental principles of policy which should be decided upon.

Practicing Veterinarians

The practicing veterinarian is the foundation of the veterinary profession. The veterinary sanitarian is a safeguard and a necessity to the livestock industry. The sanitarian and the practitioner must work hand in hand if livestock diseases are to be controlled or eradicated. It is a fundamental necessity in the suppression of livestock diseases for the practitioner to be employed wherever and whenever possible.

However, in order that control work may be uniform, and systematically carried out, it is necessary for the practitioner to work under the supervision of the livestock sanitary official. The sanitary official is responsible; therefore, he must have complete jurisdiction over control work.

I believe it is one of the duties of this Association to endeavor to correlate the activities of the practitioner and the sanitary official. I am also of the opinion that it would be well for the veterinary profession if each state built up from the practicing veterinarians in their state a corps of sanitary officers. Appointment to this corps should be made only after proper examination, together with consideration for the standing and usefulness of the veterinarian in his community.

Accredited Herds

If the accredited herd plan is to succeed and continue, there must be no letting down of the bars. The more we work on bovine tuberculosis eradication, the more I am convinced of this fact.

There will be unfortunate breaks in accredited herds for some time to come. We must safeguard the accredited herd in every way possible. We must not go too fast. Our policy must be accuracy, and only such herds as can and do comply with every regulation of the accredited herd plan should be accredited and maintained upon the accredited herd list.
We have no desire to injure anyone who is entitled to an accredited herd certificate, but we do express the opinion that our future policy should be to issue accredited herd certificates only to purebred herds.

**Area Plan**

The area plan is, without question, the logical method to be pursued in eradicating bovine tuberculosis. Unfortunately, due to geographic and climatic conditions, it is not possible, in some sections, to carry out the area plan in every detail. In western states we have found that modification was possible without lessening the efficiency of the plan.

As you know, in western countries, cattle are out on the range and on forest reserves during the greater part of the summer. Our plan is to test in a district all cattle which are not out on the range. If we do not find tuberculosis in these pasture and dairy cattle, it is reasonable to presume that the range cattle in that district are not infected. If we find tuberculosis in any of the pasture or dairy cattle, then we test all cattle when they come in from the range in the fall of the year.

It is not advocated that such a plan be carried out in non-range states, but I may say that this plan has proved very practical and efficient in our range districts.

**Uniform Laws and Regulations**

Geographic and climatic conditions, together with state rights, make uniform regulations difficult, and in some instances impossible. Nevertheless, there is room for much improvement in our laws and regulations, and especially with those dealing with the importation of livestock into our respective states. I doubt very much if it is practicable for either this Association or the United States Bureau of Animal Industry to act as a clearing house for state regulations. Nevertheless, this Association should draw up ideal regulations from time to time and submit them to the various states for their approval.

Where natural conditions make it impractical to adopt such regulations, then it is possible for sanitary officers of adjoining states to get together and adopt regulations suitable for their particular conditions. If such a policy were adopted by states, I am sure it would be productive of much good.

**Living Virus and Vaccine**

As a livestock sanitary official, I cannot condemn too strongly the indiscriminate use of living virus. It is my opinion that this Association should go on record condemning the use of living virus in the control of any livestock disease, unless such virus is administered by a veterinarian thoroughly capable, and trained in the administration of such virus.

**Milk Inspection and the Sanitary Control of Dairies**

Our constitution provides that one of the objects of this Association shall be the study of sanitary science.

I am sure that one of the most vital sanitary studies is that of dairy sanitation. Dairy inspection should be under the supervision of a veterinarian, and yet in the past it has been the practice in many sections to-
alot this work to most anyone but the veterinarian. This is a sad mistake. Incompetent advice is costly, and the dairyman has suffered by reason of dairy inspection work not being under the supervision of men trained in livestock and dairy science.

I am sure that this Association could well afford a place for a paper or a report from a committee on milk inspection and the sanitary control of dairies.

Committees

An Association of this character must work through its committees, and committees, to be effective and efficient, must work upon their subject matter during the entire year.

I am of the opinion that the annual meeting of this Association should be devoted more to the report of committees than the reading of individual papers. The policy of having the different committees make up the program on their particular subject is an admirable one, and should be continued.

Policy Committee

Your committee on policy will make an extensive report at this meeting, and I sincerely trust that you will give their report your minute attention and consideration.

Nutritional Disease Committee

I believe that nutrition is one of the important factors in the control and prevention of diseases. Nutrition is such an important subject, and one so little known, that I took the liberty of appointing a special committee on nutritional diseases. The committee will report at this meeting, and I am sure that their report, together with the papers delivered on this subject, will warrant you in making a committee on nutritional diseases one of your permanent committees.

Committee on Abortion Disease

Abortion disease, without doubt, causes a greater loss to livestock than any other one disease. That the losses from this disease are not being decreased cannot be denied. I know that your committee on abortion disease has worked faithfully and diligently to bring an instructive message to you. Nevertheless, our knowledge of this disease is still somewhat vague, and as yet no real practical method for its control has been devised. This is an unfortunate condition, and yet it is one that must be faced. I appeal to you to pay very close heed to the report of this committee, and to discuss and thrash out every detail of their report, so that we may lend every effort to arrive at a definite policy for the control of abortion disease.

Finance

There should be little difficulty in financing an Association as important as this one; nevertheless, we are experiencing such a difficulty. Your exchequer should contain more money. You cannot, or rather, you should not, increase your dues. If you do you cannot expect all members to stay in the Association who are not here on official business. We look with displeasure on selling advertising space in our program or in our printed
report. We are equally displeased with the idea of passing the hat. What, then, is there to do? If the sale of our annual report is increased our financial difficulties will be materially lessened. Our report is one of the most valuable yearly contributions to veterinary science. It should be in the hands of every practitioner, as well as every veterinarian engaged in live stock sanitary work. Each member should undertake to sell or dispose of three of our reports. This is simply one method of increasing the revenues of our Association. Your Policy Committee has a definite recommendation to offer you on this subject.

**Secretary**

Your secretary has been most diligent and efficient. He has worked under financial difficulties. It was only through his untiring work that your last report was gotten out early in the year. With adequate finances, your report should be in your hands thirty or forty days after adjournment of the meeting. That is when you should receive it — when the subject matter is fresh in your minds.

Your secretary's office should be financed so that he could get out a bulletin on exceptional or dangerous live stock diseases as they exist in the various states. Such a bulletin would, no doubt, prevent many unfortunate and harsh state regulations, and would very materially tend to increase your membership.

Your committees have worked most faithfully and effectively, and I desire to express to them my very sincere appreciation for the work they have accomplished, and the very excellent program they have arranged.

I am not unmindful of the honor you conferred upon me by electing me your president at the last annual meeting, and again I desire to express to you my appreciation for this honor.

I sincerely trust that our Association will grow and prosper with each succeeding year, and that much good will come from our deliberations.

PRESIDENT BUTLER: I just want to mention to you that it will be pleasant for you to know that your Secretary has reduced the cost of running this Association $1,000 from two years ago. In other words, the cost of this meeting, and of running the Association for 1923 was $1,000 less than it was in 1921. Your Secretary and Treasurer has a report to make which he will make at a later time.

In compliance with the recommendation made by Dr. Munce, the President of last year, a Committee on the history of the Association was appointed. The Committee was composed of Drs. Connaway, Cary and Boog-Scott; and that Committee will now report if they are ready.

DR. CONNAWAY: Mr. President, fellow members: Your Committee has conducted quite a long investigation in regard to the first meeting of the Association, but we have not had time to confer and to get this into the brief shape that it should be in for our Annual Report, and so we beg sufficient time for that.

But the Committee has instructed me to give a brief summary of the causes that led to the organization of this Association.
In the summer of 1896 or '97, there were quite a number of outbreaks of Texas fever in Illinois, Missouri, Kansas, Oklahoma, and Nebraska, and the live stock authorities of these states in correspondence with one another and in correspondence with the Department at Washington felt that the quarantine line should be changed.

At that time the quarantine line ran two counties below the Missouri State line in Arkansas, and some distance below the Kentucky-Tennessee line, and the territory north of that line was not being properly protected.

Dr. Luckey had his breaking in on that work, the inspection of that territory in Missouri.

Government Inspectors made investigations that year under Colonel Dean, who was the Chief of the Inspection work in the west and southwest.

Investigation led to the conclusion that cooperation on the part of the various states mentioned was necessary for the control of Texas Fever, and they were making a move to get together in order to confer upon this matter, and at this time the Government was carrying on some investigation in the dipping of cattle. Some work had already been done on the Cleburg Ranch in Texas under Dr. Norgard. Dr. Francis of the College Station in Texas in cooperation with the Missouri Experiment Station was also carrying on some work. This led the Fort Worth Stock Yards Company to put in a vat at Fort Worth so as to try out the commercial dipping.

The Superintendent or General Manager of that Company, Mr. W. E. Skinner, in consultation with one of the members of the Kansas Board, induced them to postpone this inter-state meeting until he could make arrangements to make a demonstration of the dipping process at Fort Worth, and Mr. Skinner sent out the invitations to various states to come there to witness the dipping operations.

The location of the place of the third meeting was determined by the fact that these men wanted to see something of the dipping work that might be helpful in the control of this disease.

At a meeting the states of Illinois, Missouri, Kansas, Oklahoma, Texas, Colorado and Nebraska were represented. Only two graduate veterinarians, Dr. Gresswell of Colorado and myself from Missouri attended the meeting. Illinois at that time was represented by Dr. Lovejoy, who was not a graduate veterinarian.

The main question discussed at that meeting was the quarantine line. I think Texas and Oklahoma were the only other southern states or tick infected states represented at that meeting—both of these states, however, had some free territory, their interests were north as well as south.

Arkansas, which had an invitation to attend this meeting, sent no representatives, nor did any other southern state, or any other northern states than those I have mentioned. So there was a small group of men who had a get-together meeting for the better control of that great problem, Texas fever.

Resolutions were passed asking the Federal Department to move the quarantine line up to the State Line of Missouri and Arkansas, and also
to move the line in Tennessee up to the State Line of Kentucky and Tennessee. This action stirred up Arkansas, and they demanded a hearing, so a called meeting was held at St. Louis in December of that same year, at which several of the southern States were represented.

Unfortunately I do not have a record of the minutes of that meeting and don't know the full representation. I attended that meeting, however, and know something of its discussions.

The action of the Fort Worth meeting was confirmed, and with the evidence which Secretary Wilson had from the various states, and from the resolutions passed by this Association, the quarantine line was moved farther north.

There, gentlemen, is the beginning of the real fight against Texas fever. It meant co-operation of the States; it meant co-operation of the live stock sanitary boards, it added emphasis to the importance, I think, of co-operation. There was a real problem there to solve, and they had to get together. The dipping was incidental to this, I mean the dipping demonstrations at this meeting or during this meeting. The Stock Yards put on some demonstration work, dipped quite a lot of cattle, and they already had some dipped cattle in various pens that had been dipped at different times.

This conference appointed a committee to look into this work, to see how effective it was. I happened to be one of the members of that committee, and I, along with Dr. Norgard, who had charge of the work there, we looked thoroughly over the cattle. I found out from Dr. Norgard that the Government was not yet ready to let cattle go into the northern states, although there was some little pressure on the part of the Stock Yards to hurry up this work. He felt that we ought not pass any resolutions which would embarrass the department, but we reported the good progress that was being made and left it at that.

At this meeting Mr. Cleburg of the King Ranch nominated C. P. Johnson, who at that time was Secretary of the Illinois Board of Live Stock Commissioners, as the temporary presiding officer and Dan P. Lively as Secretary of the meeting, and fortunately for us Mr. Lively made quite a complete report of this meeting, and furnished it to the Chairman and he printed it in the live stock report of that year. So we have in that report a complete report of that meeting, which I could not find in the archives of the Illinois Department of Agriculture, but fortunately Mr. Johnson sent me a copy at the time. I had forgotten all about it but in my desperation to find something in looking through my books I found this report.

I wrote also to Mr. Boog-Scott, before you added him to the Committee, I had to have help, and he increased this Committee, and through his aid we have quite a lot of additional information that he has picked up from the Texas papers, little incidental things that helped to fix the history of disease and the names of men associated with them, and so we hope to get this into a very brief and compact space so that we can print it in the records.
I do not know what you had in mind in appointing this Committee, unless you thought perhaps that a review of some of the things of the past might be helpful to us today. And so I think that going back to the first there is a very important point for us to remember in this Association, and that is that the prime purpose in the organization of this Society was not so much the educational features which have grown strong here and which we like, but the actual putting into force of regulatory measures. Regulatory measures were the things that were uppermost then and I believe that we ought not, in our enthusiasm for investigational work and educational work and getting a lot of sentiment back of us, to make the work go, ought not to forget to try out some of these things that we know ought to work, that we have a good, solid foundation, and I believe that we sometimes forget or misinterpret the feeling of the people on putting some of these things into force. When we know we are right we ought to go ahead with it.

I think I will not take up more of your time, Mr. President and members. We will get this in shape so that you can have it in the Annual Report. (Applause.)

President Butler: Dr. Connaway, and your Committee, Dr. Cary and Boog-Scott, know the Association appreciates the work and trouble you have gone to to get all of these facts together, and I am very sure that the reading of the history of the Association will do us all a lot of good, and I want to thank you for your efforts and the work you have done.

Dr. Connaway: I wish to add this: That somebody ought to give to this Committee the facts in regard to other meetings. So far as I know there is no printed record of several of the meetings. We have been able to find a little in the Breeders Gazette, a little reference to the meetings and a little information relative to the things that were done.

A Member: I move the report of this Committee be accepted and the Committee be continued and Dr. Cook's name be added to the membership of this Committee, Dr. A. B. Cook.

President Butler: It is regularly moved and seconded that the report of the Committee on the history of the Live Stock Sanitary Association be continued, and that Dr. A. B. Cook's name be added to this Committee. All those in favor of that motion will please say aye. Contrary, no. It is so ordered.

It is 11:30 now, and we might as well get the Executive Committee and a few of these other Committees here to report. Dr. Ferneyhough, is the Executive Committee ready to report at this time?

Dr. Ferneyhough: No, there is nothing before us as yet.

President Butler: Are any of the Special Committees ready to report at this time?

Dr. Miller: The Committee on the foot and mouth disease have their report ready, and I think they would like to get it off their hands.

President Butler: We would be glad to hear you, Dr. Miller.

Dr. Miller: Mr. President, last year's Committee on Foot and Mouth Diseases, as you who were here will recall, submitted a very com-
prehensive report. It was divided into two sections, one covered special recommendations, the other general recommendations. The general recommendation meets the unqualified approval of this year’s Committee and we have thought it well that we should repeat it here for the benefit of members who were not here last year. That report read as follows:

REPORT OF THE SPECIAL COMMITTEE ON FOOT-AND-MOUTH DISEASE

Last year’s committee on foot-and-mouth disease made a very comprehensive report in regard to the measures that it believed should be taken to guard against the introduction of foot-and-mouth disease into the United States. It also recommended the procedure that, in its judgment, should be followed in the event the disease again obtained a foothold in this country.

The present committee indorses unqualifiedly the recommendations that were made last year and at this time feels that it should bring to the attention of those State sanitary officials appointed during the present year who are now in attendance at this meeting the general recommendation from last year’s report, which was as follows:

“Your Committee has hoped that it might recommend less drastic measures for handling outbreaks when they occur. This does not seem possible at the present time. Considerable work has been done by foreign investigators since the war. They have tried to perfect a plan for vaccination, a safe and satisfactory treatment of those affected, and to determine if possible the shortest possible period of danger of spreading the disease. Nothing has been reported that would appear to justify us in changing our former plans for handling outbreaks. We believe that the plans used so successfully in handling the three extensive outbreaks that have occurred in this country should be again adopted in case of another outbreak. We recommend the application of rigid quarantine measures, prompt slaughter of affected and exposed animals, the cleaning and disinfection of infected premises, and the remuneration of owners for animals and other property destroyed. This Association is already on record as favoring all these measures. The matter of slaughter of diseased and exposed animals is important and the one point upon which the most opposition would be liable to occur. We also recommend that immediately on the announcement of an outbreak of foot-and-mouth disease a conference of the representatives of the live stock interests should be called at a central point for the purpose of adopting a plan of action in relation to the eradication of the disease, the education of the public, and the consideration of other matters pertaining to the problem. It would seem advisable that stockmen and live stock sanitary authorities should bear in mind that nothing better can be recommended at the present time.”

One of the specific recommendations made in that report was that the attention of the Treasury Department should be called to the danger existing through the possibility of introduction of foot-and-mouth disease in hay and straw used in packing imported goods, and such materials should
be forbidden to enter this country or should be permitted to enter only on condition that they are destroyed by fire immediately after the goods are unpacked.

The Federal Bureau of Animal Industry, upon looking into the legal phase of this subject, came to the conclusion that jurisdiction over such materials rested largely with the Department of Agriculture and immediately placed certain restrictions upon such packing materials in shipments originating in countries where foot-and-mouth disease exists. These restrictions gradually have been made more stringent and the Bureau is now working upon a revision of the regulations governing the importation of hides, skins, wool, hair, hay, straw, etc., that will require that hay and straw used for the purposes indicated in such shipments must be disinfected in accordance with certain prescribed methods prior to use and be so certified by an American consular officer or be destroyed by fire or disinfected upon unpacking of the goods in this country.

It is probably safe to assert that at no time since the Federal Bureau of Animal Industry was established and began to record all available data concerning conditions in foreign countries has the foot-and-mouth disease situation throughout the world been more menacing than at present.

Great Britain has been fighting the infection almost continuously since 1917 and notwithstanding their established method of slaughtering affected and exposed herds and flocks they suffered 1,139 outbreaks in 1922. In the early part of this year the disease apparently subsided, only to be followed by an alarming increase of cases as the summer waned. From September 1 to November 27 official reports received show infected centers in 24 of the 53 counties of England and Wales. No livestock has been permitted importation from England during the present year.

Scotland was free from foot-and-mouth disease from May 14, 1922, until October 29, 1923, when an outbreak occurred at Paisley, followed by 17 others scattered throughout 5 different counties in that country. While Scotland was free of infection a number of shipments of cattle, sheep and swine were permitted importation into the United States, but immediately upon notification of the first outbreak all outstanding permits were cancelled and the customary embargo placed in effect against further importations.

An outbreak of this disease on the Island of Jersey, the first in a number of years, occurred on June 26, 1923, and shipments from that country were prohibited until the period required under existing laws and regulations to render animals eligible for importation had elapsed after this outbreak without any recurrence of the disease.

Since the world war some countries of Europe have not resumed the former practice of issuing regular official reports covering specific livestock diseases occurring within their borders. Reports of this character available, however, indicate that foot-and-mouth disease is widespread in Europe and South America, not to mention the countries of Asia and Africa.

Of the Scandinavian countries Norway, Sweden and probably Iceland are free. Denmark, belonging to this group, has been contending with the disease for several years past and apparently with some degree of success in recent months, an official report for September indicating no outbreaks during that month.
The last official report from France shows 41 provinces infected.

On September 30, 1923, Germany reported foot-and-mouth disease on 3,294 farms, situated in 860 townships, within 256 different counties.

Japan has been officially declared free from the infection since 1910. The disease does not exist in New Zealand, Australia, Mexico or the Union of South Africa, but is prevalent in the great countries of South America, with which we are closely associated in trade.

At the annual meeting last year your special committee reported an outbreak of foot-and-mouth disease in Jamaica. While the Jamaican authorities since then have apparently obtained control over the situation they, so far as can be determined, have not yet felt justified in declaring their country free from the infection.

During the past year the Federal Bureau of Animal Industry investigated a rumored outbreak of foot-and-mouth disease in Guatemala. Two inspectors who visited that country were assured by the official veterinarian of Guatemala that a disease confidently believed by him to be foot-and-mouth disease had recently swept through the country. The assignment of these inspectors was with the approval of the Guatemalan authorities who, with others, extended every possible facility and assistance to effect a most thorough investigation. No evidence of the disease, however, could be found by the inspectors at the time of their travels, which extended across the country to a point on the Pacific coast near the international boundary line between Mexico and Guatemala, covering the territory through which the disease was reported to have spread.

It is doubtful if any of the countries of the West Indies or Central America immediately south of us have adequate regulations governing the importation of live stock from foreign countries and while we may view with some apprehension possible danger of foot-and-mouth disease being introduced into one of these countries, thus menacing the United States, there is one assured partial safeguard through the Act of Congress of August 30, 1890, which in the nature of its wording prohibits the importation into the United States of cattle infested with or exposed to ticks. These countries, or at least their coast sections, are almost invariably tick-infested and, as a result, their cattle are prohibited importation by law.

Your committee is pleased to report that the live stock sanitary officials of this country and of Canada have practically identical regulations on this subject and are extending to each other the heartiest cooperation in the efforts that are being made to safeguard the live stock producers of these countries from an invasion of this disease.

A. W. MILLER.
E. S. BAYARD.
S. E. BENNETT.
J. E. BOOG-SCOTT.
H. R. CHURCH.
O. H. ELIASON.
A. J. GLOVER.
L. H. HOWARD.
J. H. McNEIL.
F. TORRANCE.
Dr. Miller: There was a general recommendation made last year which your present committee approves. There is one phase of this recommendation that there is a little difference of opinion in the committee on, the majority members of whom I think I may say I am the spokesman, feel very little would be gained by calling a meeting as recommended until there is an outbreak of the disease. The minority members seem to think that such a meeting would be valuable along educational lines. I think the viewpoint of the majority members, I may be wrong, is based on the thought that we are not going to have an outbreak in the near future. The only specific recommendation made last year that we wish to discuss is the one wherein they recommend that the attention of the Treasury Department be called to the danger existing to the possibility of the introduction of foot and mouth disease in hay and straw used in feeding material.

The Federal Bureau of Animal Industry, even before this recommendation was made, although I do not believe the committee was aware of that fact, had been considering that phase of the subject and had come to the conclusion that the Secretary of Agriculture through authority conferred by one of the acts, had authority to handle that situation and they had placed certain restrictions on hay. These have been gradually made more stringent and at the present time the entire regulations are under government supervision.

President Butler: It is regularly moved and seconded the report of this Committee on Foot and Mouth Diseases be adopted. All in favor please say aye. Contrary no. It is so ordered.

"Are there any other special committees ready to report at this time or would you rather adjourn? What is the pleasure of the Association? I know it is on the program that the reports of the committees are to be heard this afternoon, but we have quite a long program this afternoon, and if it is the pleasure of the Association we will hear a further report.

Dr. Mohler: I have just received a letter from the Secretary of Agriculture, Mr. Wallace, with reference to his inability to be here this morning. With your permission I would like to read that letter.

President Butler: You have that permission, Dr. Mohler; we will be glad to hear it.

Dr. Mohler: This letter is self-explanatory (reading the letter as follows:)

"The Secretary of Agriculture, Washington.
November 28, 1923.

"Dear Doctor:

"I had a letter from Dr. Dyson, inviting me to address the opening meeting of the Live Stock Sanitary Association, December 4. I told him that I should try to do this and, as you know, I fully expected to be in Chicago at that time. Recent developments, however, make it impossible for me to attend the Chicago meetings this year. Will you, therefore, please express to the members of the Live Stock Sanitary Association my great regrets that I can not meet with them, assure them of my very active
interest in the important work they are carrying on, and of the desire of
myself and of everyone here to be helpful in every way possible?

Very sincerely,

HENRY C. WALLACE.

"Dr. J. R. Mohler,
Bureau of Animal Industry."

President Butler: If there is no objection we will listen to Dr.
Houck's report of his Special Committee.

Dr. Houck: Mr. President, Members of the Association: This is a
very brief report, we can complete it before the noon hour, before lunch,
and save that much time. This is the report of the Committee on the In-
terstate Shipment of Swine of the United States Live Stock Sanitary
Association.

REPORT OF THE COMMITTEE ON INTERSTATE SHIPMENT OF
SWINE OF THE U. S. LIVE STOCK SANITARY ASSOCIATION,
CHICAGO, ILL., DECEMBER 5-7, 1923.

As a result of the statements and complaints from various quarters
concerning the inconsistencies, perplexities and inconveniences encountered
in shipping swine due to the lack of uniformity of state laws and regula-
tions governing the movement of these animals, a committee was appointed
by this Association to study the subject and offer suggestions in a report
to the Association. The Committee presented its first report at the meet-
ing held in Chicago November 29, 30, and December 1, 1920. The second
report of the Committee at the 1921 meeting included a draft of regulations
for the consideration of this Association, but action on this report was
defered until the next meeting. It was believed by the members of the
Committee that these regulations would be as adaptable to the general
conditions in the various sections of the country as could be expected in an
attempt to formulate uniform regulations. The regulations covered most
of the conditions met in handling swine and were intended to serve as a
guide in preparing State regulations. At the meeting in 1922, the report
of the Committee was accepted by the Association, including the draft of
regulations; however, the Committee was continued.

In order to ascertain to what extent, if any, the States have been in-
fluenced by the Association to modify their regulations in the interest of
uniformity, your Committee on October 17 sent a questionnaire to the
live stock sanitary authorities of all the States in the Union. Up to the time
this report was prepared, November 20, replies had been received from 30
out of the 48 States, or 62½ per cent.

Several State veterinarians replied that they had not seen a copy of
the proposed regulations and were unable to answer the questions.

One State out of the 30 has no laws or regulations to control the move-
ment or importation of swine, and two have no regulations as this matter
is covered directly by the State laws. Therefore, this report is limited
to 27 States.

The officials of two States say that their present regulations are prac-
tically the same as the regulations approved by the Association.
One State veterinarian says that the regulations in force in his state are safer and better than those approved.

Three States are considering a revision of their regulations along the lines suggested.

Laws exist in approximately one-fourth of our States which would conflict with a modification of their regulations as suggested, and in other States it would be necessary to enact additional laws before such regulations could become effectual.

The questions sent out by your Committee were as follows:

1. Have the regulations outlined in the report of the Committee at the last meeting of the Association been adopted in your State?
   Replies to this question were 100 per cent "No."

2. Have any changes been made in your regulations since the last meeting of the Association in conformity with the suggestions in the report of the Committee?
   Twenty-two States replied "No" and 5 "Yes."

3. Please state what changes, if any, have been made in your regulations in conformity with the report of the Committee.
   Twenty-two States replied "None," and in 5 instances the replies indicated that minor additions or revisions had been made to their regulations during the past year.

4. Are the regulations outlined in the last report of the Committee adapted to the conditions in your State. If not, in what respect do they fail to meet the conditions in your State.
   Eleven States replied positively "Yes," but the replies of 16 indicated that the proposed regulations did not entirely meet their conditions.

The Association has indicated its favorable attitude toward the matter of uniformity in State regulations. A draft of regulations has been approved by the Association and published in its report. The Association can only offer suggestions; it depends entirely upon State authorities whether or not State regulations shall be uniform. It seems from the reports received that most States are inclined to continue to formulate regulations which they believe are adapted to their needs regardless of uniformity.

It would seem that the Committee on Interstate Shipment of Swine has finished its work and it is suggested that it be dismissed.

The matter of uniformity in State regulations controlling the movement not only of swine, but of all live stock, is important and should receive serious consideration. There is no doubt that there could and should be more uniformity in State regulations than there is at present.

W. G. HOUCK, Chairman
H. A. WILSON,
W. H. SIMMONS,
P. MALCOLM,
R. C. JULIAN.
President Butler: What is the pleasure with reference to the report of the Committee on the Interstate Movement of Swine? Dr. Houck, will you make a motion that this report be accepted?

Dr. Houck: I make such a motion.

A Member: Mr. President, I feel the report should be accepted, with one exception. The report contains the recommendation that the Committee be discharged, and I think it would be a mistake if you discharged this Committee at this time. They have just started work and have worked a year, and though the results may seem to them discouraging, that not more states have shown willingness to accept the proposed regulations, they are working along a line that is very, very important, and it is thought that the work is just started and perhaps further work with the individual states will bring much better results than they were able to report this year. Therefore, I would amend the motion to say, while the Committee's report shall be accepted, then the Committee be continued and urged to continue the work.

Dr. Houck: I accept the amendment to the original motion that the Committee be continued.

President Butler: The amendment has been accepted and it has been regularly moved and seconded that this report be accepted with the provision that the Committee be continued and not discharged. All in favor please say aye. Contrary no. It is so ordered.

On convening this afternoon we will finish up with the reports of Committees, and the first Committee to report will be legislation. There are four standing Committees, Legislation, Finance, Credentials, and Resolutions, these are the four standing Committees, and they will report immediately on convening this afternoon. Also, if it so pleases the Association, the Advisory Committee, the Committee on Grievances, Live Stock Diseases, and the Special Committee on Skin Diseases, that will be the first order of business this afternoon.

It is 12 o'clock now, exactly, and previous to a motion to adjourn, I wish to say there is nothing on the program to state what time we will meet this afternoon. Before we adjourn, therefore, I wish some one would make a motion designating the time we will meet this afternoon.

Dr. Ferneyhough: I suggest 1:30.

A Member: I second it.

President Butler: It is regularly moved and seconded we meet this afternoon at 1:30. All those in favor please say aye. Contrary no. It is so ordered.

Recess until 1:30 o'clock P. M. of the same day.
AFTER ADJOURNMENT.

1:30 o'clock P. M.

President Butler: Gentlemen, we will come to order. I trust you will realize there is no desire on the part of the Chair to rush you or hurry you. If we say we are going to meet at a certain time we want to meet at that time, and then if you do not want to meet at that time, make a resolution to meet at 2:00 o'clock or 3:00, and it is all right. But if we say 1:30 we like to get started right close to 1:30.

The first Committee to report this afternoon should be the Committee on Legislation. Are any members of the Committee on Legislation present? We will pass that Committee.

The next is the Committee on Finances. I had a letter from Dr. Way, saying he would be unable to be present at this meeting, and your Committee on Policy has taken over some of the work that would have been taken up by the Committee on Finances.

Our Committee on Finances for the past two years has been made up by one active member of this Association, and some outside gentlemen who are interested in the financing of live stock sanitation. Last year they presented a very good and comprehensive report, but this year nothing particular has come up and they were unable to get together, and Dr. Way advised me that they would pass that report.

The next Committee is the Committee on Credentials. If they have anything to report at this time we will be glad to hear from them. The Committee on Credentials, as you know, generally work during the week, it is simply a matter of form for them to report at this time.

The fourth standing Committee is the Committee on Resolutions. Dr. Howard was not here this morning, neither was Dr. Hilton or Dr. Armour. So I have taken it upon myself to appoint Dr. Gibson as Chairman of a Temporary Committee. If Dr. Gibson has anything to report at this time I will be glad to hear from him.

Dr. Gibson: The resolutions Committee is not ready to report, Mr. President, but we will try to report tomorrow afternoon. I will say that any who have resolutions they wish presented we will be glad to receive them today.

President Butler: The Advisory Committee, as you know, functions in case there is an emergency and your officers should have advice, it is an excellent committee, especially in times of bad outbreaks of disease.

If anybody has a grievance the Committee on Grievances will be glad to take up that particular grievance. The Chairman is Dr. W. K. Lewis of South Carolina and Dr. W. T. Spencer of Omaha and Dr. William A. Stephenson of Salt Lake City.

President Butler: Dr. Lamb, have you a report on Special Skin Diseases?

President Butler: Dr. Lamb of the Committee on Special Skin Diseases.

(Thereupon Dr. Lamb read the Committee's Report, as follows:)
The prevalence of skin diseases and their eradication probably interests, and causes more grief and grey hairs, to more Live Stock Sanitary officials than any other branch of their work, not because most of the diseases are not well understood and their treatment well known and invariably successful when properly applied, but because of the perverseness of human nature and the obstacles thrown in the path of the sanitary officials, by the owners of the affected animals, of a political, legal and, frequently, of a physical character, which obstacles result in the delay and, very frequently, in the positive prevention of the object of the eradication of the disease in a given locality. Why these obstacles should be placed in the way of officials engaged in a work which is wholly for the benefit of the obstructionists is beyond the comprehension of the writer.

Unfortunately, no figures are available showing the prevalence of scabies in sheep and cattle during the year 1923, hence no comparison with former years is possible, but a report from the U. S. Bureau of Animal Industry shows that during the calendar year 1922, cattle scabies was more or less prevalent in 18 states, that in these states 961 herds containing 339,700 cattle were found affected. That sheep scabies was found in 28 states affecting 2,021 herds containing 2,423,481 animals.

| SCABIES IN SHEEP |
|-----------------|----------|----------|
| States          | No. Herds | No. Infected |
| Arizona         | 468       | 695,241    |
| California      | 272       | 323,240    |
| Colorado        | 86        | 80,298     |
| Idaho           | 36        | 56,385     |
| Illinois        | 35        | 10,554     |
| Indiana         | 23        | 993        |
| Iowa            | 39        | 2,091      |
| Kansas          | 10        | 2,481      |
| Kentucky        | 38        | 6,196      |
| Louisiana       | 2         | 531        |
| Massachusetts   | 1         | 50         |
| Michigan        | 13        | 3,315      |
| Minnesota       | 3         | 279        |
| Missouri        | 44        | 7,517      |
| Nebraska        | 33        | 63,827     |
| Nevada          | 8         | 14,972     |
| New Mexico      | 467       | 434,070    |
| New York        | 2         | 232        |
| Ohio            | 8         | 661        |
| Oklahoma        | 1         | 2,150      |
| Oregon          | 180       | 144,659    |
| Pennsylvania    | 4         | 168        |
| South Dakota    | 5         | 1,412      |
| Texas           | 132       | 369,775    |
| Utah            | 13        | 24,898     |
| Virginia        | 2         | 200        |
| Wisconsin       | 5         | 960        |
| Wyoming         | 91        | 176,326    |
| **Total**       | **2,021** | **2,423,481** |
## CATTLE SCABIES

<table>
<thead>
<tr>
<th>States</th>
<th>No. Herds</th>
<th>No. Infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>3</td>
<td>3,071</td>
</tr>
<tr>
<td>California</td>
<td>5</td>
<td>189</td>
</tr>
<tr>
<td>Colorado</td>
<td>73</td>
<td>18,797</td>
</tr>
<tr>
<td>Illinois</td>
<td>7</td>
<td>240</td>
</tr>
<tr>
<td>Iowa</td>
<td>20</td>
<td>491</td>
</tr>
<tr>
<td>Kansas</td>
<td>48</td>
<td>3,480</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>6</td>
<td>167</td>
</tr>
<tr>
<td>Missouri</td>
<td>2</td>
<td>90</td>
</tr>
<tr>
<td>Montana</td>
<td>70</td>
<td>33,754</td>
</tr>
<tr>
<td>Nebraska</td>
<td>256</td>
<td>110,714</td>
</tr>
<tr>
<td>Nevada</td>
<td>12</td>
<td>438</td>
</tr>
<tr>
<td>New Mexico</td>
<td>185</td>
<td>27,468</td>
</tr>
<tr>
<td>North Dakota</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>15</td>
<td>15,072</td>
</tr>
<tr>
<td>South Dakota</td>
<td>121</td>
<td>32,152</td>
</tr>
<tr>
<td>Texas</td>
<td>72</td>
<td>66,141</td>
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<tr>
<td>Utah</td>
<td>34</td>
<td>1,478</td>
</tr>
<tr>
<td>Wyoming</td>
<td>81</td>
<td>25,947</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>961</strong></td>
<td><strong>339,700</strong></td>
</tr>
</tbody>
</table>

The report also shows that there were dipped during the year

<table>
<thead>
<tr>
<th>Year</th>
<th>Sheep</th>
<th>Cattle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920</td>
<td>8,947,386</td>
<td>1,076,516</td>
</tr>
<tr>
<td>1921</td>
<td>9,065,067</td>
<td>1,036,827</td>
</tr>
<tr>
<td>1922</td>
<td>7,129,434</td>
<td>799,396</td>
</tr>
</tbody>
</table>

Showing a marked decrease of infection in both sheep and cattle.

Reports from many of these states indicate that strenuous and continued efforts are being exerted by both State and Federal authorities to eradicate the disease with the result that the situation is improving and the disease is slowly but surely being overcome, and if sanitary officials could receive the hearty support and cooperation of the herd and flock owners which they should and which one would think they would receive, these diseases could be eradicated in a comparatively short time.

There are other diseases of the skin besides scabies, which cause more or less trouble to sanitarians. These are usually local in character and their cause often very puzzling. Dr. Cloud of Texas reports a disease of this character affecting cattle in certain localities in Southern Texas and sends a report regarding it by Dr. J. K. Northway of Kingsville, Tex., which reads as follows:

### SAND BURN

An affection affecting all domesticated animals of which very little is known as to etiology, distribution or pathology. There seems to be a conflict of opinion in the minds of ranchmen and veterinarians of this section. In the past few years I have had under observation and for treatment several hundred cases; in some I have obtained wonderful recovery,
while others were equally disappointing. I have therefore formed some ideas and conclusions as to cause and treatment.

The cause of etiology of this affection is supposed to be one of the following:

(1) Vaporization or fumes arising from alkali deposits following heavy dew or rainfall.

(2) Dew or rainfall in sandy sections followed by intense heat. (A popular belief among the Mexicans.)

(3) A weed commonly known as the “Milk Weed.” The theory is that the animal while resting crushes the weed, and the juice, being very irritating, produces the sand burn.

Distribution—From information obtainable it appears as though this affection is confined to the coastal regions of Texas and Mexico, particularly the sandy sections; in fact, all cases which have come under my observation have originated in sandy land. I have never known of a case to originate in black or black sandy loam land. In this section of the state there are several pastures in which animals are sure to burn under favorable conditions, i.e., a damp rainy period, or when the dew is heavy, either in the spring or summer months. On one or two occasions have observed cases which occurred during winter months, particularly during a hot period. There are also lowlands or wet weather lakes in this section in which horses have been known to burn while passing through. Stockmen in this section have through experience learned to move cattle and horses from these pastures during such periods.

Susceptibility—All domesticated animals are subject to this affection, more especially the horse and cow. Color also plays an important factor; white, gray, dun and paints are more susceptible. Horses with what is known as nip nose, baldfaces or stocking-legged frequently burn only on these parts, while horses of the solid darker colors burn less frequently; however, they are not immune. There are stockmen in this section who refuse to use an animal of the lighter colors on their ranches.

Duration—The affection will heal when treated early and properly in from two to four weeks, usually leaving a barren area, which varies in size according to extent of affection. In cases of mild affection the hair follicles are not destroyed and sometimes coat over completely. In the more severe cases they apparently never heal and will become inflamed with very little provocation.

Treatment—Local applications of ointments, either Unguente (Norwich Chemical Company), Mercurial, Cresylic, Carron Oil; or, better, prepare a thick paste of lime, linseed oil and 2% Phenol. This preparation should be applied thickly with paint brush. I have better results by not applying soap or water in cleansing. Patient should be removed to well ventilated, dark stall, if easily handled; if unbroken range animals, place in well shaded corral, allow laxative diet and plenty of water.

Conclusions—This affection is caused by the fumes arising from the alkali deposits following dew or rainfall, more especially on hot, damp and sultry days. This conclusion is also proven by the fact that horses left unhitched and known not to have rolled have become burned on upper parts
of the body. Again I have seen horses left tied where there was no vegeta-
tion become suddenly crazed by the affection; it is then that he may
during his pain and excitement roll, kick or paw the ground in effort to
relieve pain.

**Distribution**—In the sandy section of this State and Mexico, more es-
pecially in the lowlands or lake regions; where alkali deposits are plentiful;
never in the black loam or sandy loam land.

**Treatment**—Treatment consists of medication as indicated in burns and
immediate removal to comfortable quarters.

Dr. F. E. Murray, U. S. Inspector in Charge at Salt Lake City, Utah,
reports a condition in Utah and Nevada presenting a peculiar skin lesion
in cattle that gives a positive reaction to the intra-dermal tuberculin test.

He states that a rather large number of specimens of these skin
lesions have been sent to the Bureau and about 50% do not show acid
fast bacilli and in some cases, where acid fast bacilli were demonstrated,
laboratory animals were inoculated with emulsions and a large percentage
of these failed to reveal lesions of tuberculosis.

So it is evident that much remains to be done in the field in the ap-
lication of the well known remedies to the well known skin diseases to
the end that such diseases may be gradually but surely eradicated, and
much also remains to be done in the laboratory and experimentally in de-
termining the cause and the remedy for many diseases of the skin that
are not, as yet, well understood.

President Butler: Doctor, we thank you for that report. I am sure
that is too interesting a report to go without being discussed, without
some questions being asked, so the floor will be opened for discussion.

That is a very interesting statement that Dr. Murray made in that
report, about some of these animals infected with the skin diseases react-
ing to the intra-dermal tests. I am sorry Dr. Murray is not here to tell
you about that, because I am sure that is worthy of some investigation.

I did not know that condition myself—pardon the Chair for making
a remark—we know of a condition that we get in the summer and fall
which, for lack of a better name, we call pollen dermatitis. We presume
it is due to pollen and it is probably a variation of other skin diseases
found during the pollen season, and I was just wondering if that would
be somewhat along the lines reported by Dr. Murray. We live in the same
country and under the same conditions.

If there is no discussion on that particular report, we would like to
hear from Dr. Turner. Dr. Turner, will you give us a report on Live
Stock Diseases? Dr. Turner.

**United States Live Stock Sanitary Association**

**Report of Committee on Live Stock Diseases**

**Chicago, Ill., December 5, 1923.**

We learn in reviewing the reports of former committees that the pre-
scribed functions were not well defined when this committee was originally
established. It has been customary in the past for similar committees to
report upon the existence, extent and control of new or unusual diseases, or
conditions which have endangered the health of the live stock industry.
Some of these committees have stressed the importance of employing the available knowledge of disease prevention. Formerly the Association has appointed special committees to investigate and devise methods of control for such diseases and conditions, as have become so prevalent as to require special consideration.

Special committees have been appointed on Hog Cholera Control, Interstate Shipment of Swine, Infectious Abortion, Nutritional Diseases, Special Skin Diseases, Tuberculosis, Tick Eradication, Foot and Mouth Disease and Live Stock Diseases. Therefore in this report we have not given these special consideration.

It is suggested that the functions of the committee on live stock diseases should be so defined that they will conform with section 2 of the Constitution.

We desire to emphasize the importance of applying the present knowledge we have of the nature of the diseases that are under control, to the end that they are minimized. It is not a function of this committee to discuss the pathology of disease—it should consider the knowledge that we have on the prevention, control and eradication of disease, and make recommendations to lessen the losses therefrom. We should utilize every available agency for the prevention, control and eradication of disease, which is the function of live stock officials.

Future committees should endeavor to set forth as far as possible facts and principles to be observed in the prevention, control and eradication of known diseases, and should not be satisfied with methods that simply hold these at a point where they can be endured.

We recommend that the duties of this committee be defined so that future reports specifically consider:

1st. Any disease or conditions which have not been identified, and have become more or less prevalent. Such reports should be confined to recommendations of practical methods of prevention, control and eradication. (The disease should be studied by research or veterinary organizations.)

2d. It should report on any disease when it assumes epidemic proportions, unless the Association supports a special committee for that disease.

3rd. It should endeavor to obtain reliable statistical information of the existence of disease in the various sections of the country.

4th. In addition to these suggestions this committee each year should concentrate its efforts on formulating effectual measures to meet existing conditions as reported.

5th. Each year the committee should recommend the tried and proved methods to be employed in prevention, control and eradication of one of the transmissible live stock diseases.

Western members report that lymphangitis in cattle is increasing rapidly, and is giving them much concern. Traum, in reporting this disease, called attention to the fact that affected animals, when tested with tuberculin by the intra-dermal method, would very often show a typical reaction to this test. As the control and eradication of tuberculosis in the
western states is largely dependent on the use of the intra-dermal test, this disease obviously presents a very serious problem. To class as tuberculous all animals which react to the intra-dermal test in districts where this disease exists can only result in bringing the tuberculin test into disrepute, as true tuberculosis cannot be demonstrated at autopsy. On the other hand, to disregard reactions to the intra-dermal test in the case of all animals showing the presence of lymphangitis is not safe unless they can be retested to exclude tuberculosis, which might be present simultaneously.

What appears to be the most needed in this connection at the present time is a concerted investigation of this disease by the states where it occurs, and the Federal Bureau. Such actions ought to make a co-ordination of results possible which would at least lead to a definite policy in handling this disease in its relation to tuberculosis eradication work. It would seem that no advantage could be derived from longer ignoring the importance of this disease, and that the issue involved should be frankly faced at this time.

Referring to the extended reports rendered to this Association by previous committees on various identified, as well as unidentified diseases, this committee at this time has no additional data to present that would be of any practical value.

The President has asked the committee to include in its report the subject of transmissible disease prevention. This is a big topic; in fact, it is the outstanding purpose of the Association. To present this subject in detail, as it should be presented, would require a very lengthy report. The committee therefore aims only to call attention to the relative importance of prevention in comparison with other measures employed to preserve the health of our flocks and herds. In many of the states there are readily recognized transmissible diseases that frequently occur, and for which no regulations exist to govern the handling and transporting of animals affected.

We recognize that the adoption and enforcement of practical uniform regulations will prevent, control and eventually eradicate many of our dangerous transmissible diseases, and suggest that future committees formulate regulations to govern the spread of these diseases, and present them before this Association for discussion and action.

In the opinion of this committee the subject of research deserves special attention at this time, further knowledge concerning the nature of animal diseases being pre-requisite to increase efficiency in their prevention, control and eradication. In view of the need for detailed information which may be directly applicable to the prevention of live stock losses from infectious and non-infectious diseases, nutritional deficiencies, plant poisoning and other conditions unfavorable to the economical production and marketing of live stock, it is recommended that every member of this Association, and in particular those who hold state and Federal offices, do all in their power to encourage research in veterinary science, animal nutrition and live stock management.

In order to bring these needs before the Association in a definite form, the committee makes the following recommendations:
1. That the Secretary of Agriculture be requested to expand the re-
search activities of the U. S. Bureau of Animal Industry.

2. That the administrative authorities in all veterinary colleges in the
United States be requested to maintain research departments, to organize
their curricula and budgets that the various members of the faculty may
have the time and equipment to enable them to conduct original scientific
study.

3. That every state agricultural experiment station in institutions
which include no veterinary college, have attached to their staff one or more
veterinarians qualified to conduct original research, these men to be free
from teaching, extension and regulatory duties, so that their entire time
may be devoted to research. In states where such provision does not exist,
the live stock sanitary authorities should present the need to the respect-
ive university authorities, and offer to support efforts to secure adequate
facilities.

That veterinary colleges provide facilities for graduate and post-grad-
uate work for the training of veterinary health officers.

If this report is accepted by the Association it would imply that the
Association's Secretary should communicate the recommendations to the
Secretary of Agriculture and to the chief live stock sanitary officer in
each state.

H. W. Turner, Harrisburg, Pa., Chairman

L. Van Es, Lincoln, Neb. Robert Graham, Urbana, Ill.

President Butler: Dr. Turner's report is now open for discussion.

Dr. French: In the report just made the mention was made of using
the intra-dermal test on cattle infected with lymphangitis and giving a
reaction to the tuberculin test. I am wondering if using the opthalmic
test you get that reaction just the same as the intra-dermal test.

Dr. Turner: I have not had much experience in testing these animals
in the west, but a little in the east, and I find in some cases we do get
reactions to the subcutaneous test, but I do not believe we get any reaction
from the opthalmic test. In that report I mentioned we retested these
animals, I did not mention the test that was to be used.

Dr. French: As a matter of fact we get quite a few reactions out in
Wyoming where we do not find lesions, and I don't know whether lymph-
angitis causes it, but we have some difficulty in finding lesions in all the
cattle that react. I don't know whether that is true in every place where
they are tested or not.

President Butler: Dr. Traum, in testing these cattle where they have
lymphangitis, did you find an acid fast bacillus?

Dr. Traum: Yes, we always did.

Dr. Traum: Mention has been made by Dr. Turner here today that
they do not get opthalmic reactions and I find some of the work that is
done in Wyoming, in which they had injected artificially avian tuberculin, they got reactions from the ophthalmic test. I think in most cases you will find that is the case. I have records of tests made by state and federal officials in Georgia in which no other lesions of any other kind were found and I think they gave both the intra-dermal and ophthalmic reactions.

One case I recall just now is a herd of 216 animals in which three reactors were found. All these three were classified as reactors on the intra-dermal test, two of them on the ophthalmic test and one of the three was classified as suspicious on the ophthalmic test. This test was made in the spring of 1922 and the only lesions found were these so-called lymphangitis lesions. There were no other reactors in the herd.

President Butler: Dr. Lamb, will you make a motion that your report be accepted?

Dr. Lamb: Yes, I move the report be accepted.

President Butler: It is regularly moved and seconded that the report of the Committee on Special Skin Diseases be accepted. All those in favor say aye. Contrary no. It is so ordered. Now, the approval of the Report of the Committee on Live Stock Diseases is before the Association. Dr. Turner.

Dr. Turner: I move that report be accepted.

President Butler: It has been regularly moved and seconded that the report on Live Stock Diseases be accepted. All those in favor will say aye. Contrary no. It is so ordered.

Dr. Munce: Are you ready to report on the Policy Committee?

Dr. Munce: Yes, sir. Mr. Chairman, gentlemen, in compliance with a resolution adopted last year, President Butler appointed a Committee of Five, consisting of Dr. Mohler, Dr. Welch, Dr. Jacob, Dr. Edgington and myself to draft the policy for the guidance of the officers and members of the Association and directing that the report be submitted this year: The Committee has not had opportunity to make as complete a study of the situation and the proposition as we believe it deserves, and we are not prepared at this time to render a final report. We have, however, prepared a preliminary report to take care of certain phases of the matter which comes within the scope of the Committee, and which we believe demands immediate attention, which we would like to submit at this time.

PRELIMINARY REPORT OF COMMITTEE ON POLICY FOR THE UNITED STATES LIVE STOCK SANITARY ASSOCIATION

In the endeavor to formulate a permanent policy to guide the future activities of this Association, which it is proposed to submit for your consideration, the Committee has become impressed with the immediate necessity of providing adequate financial means in order that the Association may continue to function. It is, therefore, intended to submit the following amendment to the constitution:

That the live stock sanitary department of each state shall be eligible for active membership and to be officially represented by the proper live stock sanitary official of that state. The an-
Annual dues for such membership shall be twenty-five ($25.00) dollars. The annual dues for regular membership shall be two ($2.00) dollars as at present.

For several years it has been observed that the Association has ceased to function along the lines of the specific purpose for which it was originally organized. This is probably accounted for by the too liberal interpretation of Section 11 of the Constitution. As a result, there has been a duplication of effort and purpose on the part of this and other associations.

Many important problems, of a regulatory nature, having a direct or indirect bearing on the prevention and control of transmissible diseases of live stock and which rightfully should be considered here, have been conspicuous by their absence from our programs.

Those actively engaged or interested in regulatory or live stock transmissible disease prevention and control measures have a right to rely upon this Association for information and guidance, irrespective of whether it applies to animals or animal products, such as meat and milk. It is therefore proposed to amend Section 11 of our Constitution to read as follows:

The purpose of this Association shall be the dissemination of information and the unification, so far as possible, of methods and regulations pertaining to the prevention, control and eradication of transmissible diseases of live stock, including poultry.

It is proposed to amend Section IV of the Constitution to read as follows:

The official ranking officer representing the live stock sanitary departments of the various states, the Chief of the United States Bureau of Animal Industry, the Veterinary Director General of Canada and the elective officers of the Association shall constitute the Executive Committee.

It is proposed to amend Section 11 of the by-laws to read as follows:

The Executive Committee shall transact the necessary business of the Association and shall make recommendations covering the activities of the association.

T. E. MUNCE,
Chairman.

SUPPLEMENTAL REPORT OF COMMITTEE ON POLICY

WHEREAS, The promiscuous distribution and use of biological products containing living organisms or viruses is dangerous and a menace to the live stock industry, and

WHEREAS, Much money is being appropriated and expended in an effort to prevent, control and eradicate transmissible diseases of live stock, particularly some of the diseases in which the living viruses are being used, and

WHEREAS, A number of our states are expending considerable money for the training of men in the diagnosis, prevention, treatment and control of transmissible animal diseases, and
WHEREAS, The present low enrollment of students in these colleges is believed to be the result, in part, of legislation adverse to the practicing veterinarian, and

WHEREAS, The present rate of graduating trained veterinarians, unless increased, will not insure the live stock industry of this country the necessary veterinary protection; therefore be it

RESOLVED, That this Association go on record as opposed to the use of living organism biologies by laymen and to the enactment of any legislation that will legalize the use of such products by any persons not trained in the diseases of animals.

Mr. President—Gentlemen of the Association:

Your Committee on Resolutions begs to report as follows:

WHEREAS, The Committee on "History" of this Association has made a very interesting report; and

WHEREAS, Many of the members of this Association desire a complete and authentic history of the Association in condensed form; be it

RESOLVED, That it is the sense and wish of this Association that the Committee continue its work to the completion of such history in as brief form as possible, clearly setting forth all the important actions of this Association in connection with outbreaks of communicable disease of live stock in book form to be sold to members of this Association and others interested in live stock sanitation; said book to be sold at a good commercial profit, the surplus funds from such sales to be added to the treasury of this Association.

WHEREAS, During the past summer, anthrax has existed to an alarming degree in one of the central western states; and

WHEREAS, The sanitary officials of the state apparently did not have sufficient authority and means at their disposal to properly control the infection and thus protect the live stock interests of adjacent and other states; therefore be it

RESOLVED, That if the state live stock sanitary authorities do not establish and maintain a quarantine of anthrax-infected forms, or other premises and live stock thereon until such time as all live stock have been vaccinated and sufficient time has elapsed to establish immunity, the Federal Department of Agriculture, through its Bureau of Animal Industry, be requested to exercise the authority conferred upon it by Congress to prevent the interstate dissemination of animal diseases and quarantine all infected districts.

Respectfully submitted,

W. J. ARMOUR,
J. I. GIBSON,
C. E. COTTON,
C. A. CARY,
Committee.

President Butler: It is a pretty important matter, the amendments to the Constitution will have to wait over and be voted upon at the next regular meeting. What is your pleasure with reference to this report at this time?
I might say that there was an amendment offered at the last meeting providing for an increase in dues. This report in a way supersedes that amendment, but the Chair, of course, will rule that any amendment in this report that refers to dues can be acted upon at this meeting. Other matters with reference to amending the Constitution or by-laws cannot be acted upon at this meeting, and will have to lay over for one year.

What is your pleasure with reference to this report at this particular time? Do you want to vote upon it now, or do you want to consider it and vote on it at the business meeting?

Do you want this report to be deferred, Dr. Munce?

Dr. Munce: I think the Committee regard it as immaterial. There is no desire on the part of the Committee to rush the matter through without consideration, without the consideration to which it is entitled. The only question is with reference to the finances, as pointed out by the President and referred to by Secretary Dyson, who is very familiar with the situation, and who may think it might be advisable to act upon it now, Mr. Chairman, in order that the Secretary and Treasurer would know just where he stands, and in order to bring the matter before the house for at least further discussion, I move that the amendment be adopted with reference to dues.

Dr. Ferneyhough: I will second that.

President Butler: It is regularly moved and seconded that the amendment with reference to the dues of the Association be adopted. Are you all ready for the question?

Dr. Fitch: Mr. Chairman, in the consideration of this question it seems to me there are several important things for this Association to look at, not only is this recommendation in regard to dues an innovation, but certain other of the recommendations in this report are definite, specific and to the point. In my own judgment it clarifies the atmosphere that this Association has been in. In other words, this Association has had a somewhat clouded atmosphere as to exactly what its function really is. Now, this report definitely states that this Association is concerned with regulatory and control measures, and that is what is implied in its name, and for that reason I am thoroughly in favor of the recommendation in regard to dues and the recommendations in regard to the other changes in the Constitution.

Dr. Ricords: Mr. Chairman, was anything like a canvass of the various states taken to ascertain the legal possibilities of those contributing members? I am frank to say in the case of our own state it may be legally impossible to do it. The restrictions on some state funds are rather peculiar. That is a thing that would have to be considered, I think, or otherwise it might be found that in about half of the states it would be legally impossible and then the state official or somebody else with a large heart might have to dig up the $25. Possibly the Committee has polled the states on that.

Dr. Munce: It has been impossible, Dr. Ricords, to take a poll of every state, but as stated in presenting the report, we are endeavoring to get in touch at this meeting with as many as possible of those represen-
tatives and those whom we asked stated that they would take care of the situation. But the provision is made that in the states in which there are legal complications which would not permit them to pay dues to the sum of $25, that they may continue as members as at present and enjoy all the privileges just the same, because it was felt if we were to hold back proceeding along this line until absolutely every state adjusted its laws in order to comply with it, it might be years, regardless of whether or not the state can comply with the provisions, they would still be in a position to maintain membership as at present.

Dr. Ferneyhough: I wish to state as a state official that as far as Virginia is concerned I will tell you right now Virginia will stand for it. If this Association is to function, we have got to know where we are now, and we cannot function without the proper finances, and it certainly should not be incumbent upon the individual to pay the increased dues and it is nothing but fair that the state government should pay that $25, if it is necessary, and I think perhaps if you have got to know, now is a good time to know, and I tell you Virginia will stand for it.

President Butler: Are there any questions about this? I don't know whether you all just understand it. It does not increase the dues of active members, that is, for individual membership.

Dr. DeVine: Mr. President, is there not intertwined in that recommendation the fact that those who could not comply with it then could not be active members of the Executive Board?

President Butler: Not as I read it, no. It simply means that they say there, this is my understanding of it, that the individual states owe something to this Association, hence they should give something to this Association. Now, the regulatory officers get a great good out of this Association and if the states are getting that protection from their belonging to this Association, information which is disseminated by this Association, then the individual states should be willing to pay a little more than the members.

Dr. DeVine: Suppose some do and some do not?

President Butler: As I read it, then, there will not be any difference, that the Live Stock Sanitary Department of each state be eligible for active membership and by the official representative or the proper official sanitary official of that state, the annual dues for such membership shall be $25, the annual dues for regular membership shall be $2. It is just that, if the state is to be a member and have an official representative here then they should pay a $25 fee.

Dr. DeVine: I don't know whether we could do it legally unless we took it out of our own pockets.

President Butler: As I read this any one who is engaged in live stock regulatory work or live stock sanitary work, or live stock work of any kind is eligible for membership just the same with full voting powers as he is now. Is not that correct, Dr. Munce?

Dr. Munce: Mr. President, it is simply this: It provides for membership in this Association of the State Regulatory Organization more than the individual, as proposed last year, it was thought better to make
provision for membership in this Association of the various states and for the states to pay for it rather than to increase the individual dues to $5.00, and permit the prevailing rate of dues to continue. It is felt that if this Association is not worth $25 to the State Regulatory organizations, then there is something wrong with it.

Secretary Dyson: Mr. Chairman: This Association has been traveling on credit for the last two years. The resolution passed at the last session provided for the increasing the annual dues to $4.00. I think there were 47 that contributed the additional two dollars. I did not undertake to make a collection of $4.00 from all members. I had trouble enough to collect $2.

Now, if the country at large is to derive full benefit from this Association we must get the annual reports in the hands of just as many veterinarians as possible. We have to increase our funds, but if we charge a $5 membership fee, the first thing we know we will lose a large per cent of our membership.

We are getting out of the woods now, we only have a small deficit. If we could start now and go to the printer with cash in hand we would get the benefit of a little competition and reduce our expenses. We have been spending part of our funds in advance of getting them. I had to take the fees collected in 1923 to pay the expenses of 1922. We have had a deficit several years, but the big thing is to have our membership as large as possible and if you increase the dues to $4 we will have but a small attendance here in the future.

Dr. Gibson: Mr. President, I am a little timid about discussing this matter because in one way it is not of special interest to me, further than this: I was once engaged in regulatory work and my sympathies continually go out to the good fellows who are carrying on that line of work. I know something about their difficulties and hardships and there are good regulatory men who fail to come to this meeting because they are living on a half salary, serving their state, and could not put a dollar into the expense of coming to this meeting into their expense accounts. I feel that this $25 membership fee will make the goat of Virginia probably.

Dr. Ferneyhough: That is all right.

Dr. Gibson: I would hate to see anything like that done in Virginia. It seems to me that there are a lot of men here that have not said anything about this, regulatory men that know full well when they put that proposition up their financial supervisors, whoever they be in the various states, that they would be up against considerable trouble and it would be a serious thing for the future of this Association if we should unwittingly adopt a regulation like this, or any other that would interfere with the free action of membership of the regulatory men in this Association. I think myself it is a pretty doubtful procedure.

If we could run on a more economic basis, as our good present Secretary has undertaken to run this Association, and could dispose of large numbers of our reports, if we could have an authentic condensed history of this Association come from the Committee of which Dr. Connaway is head, and of which he made such an interesting report this morning, that
book could be sold to individuals who would like to have the inside history of this Association, so that it would be a convenient reference book. That book could be sold for money and thus help the Association financially. But I feel this is putting a lot of trouble onto a lot of regulatory men and, for instance, on state veterinarians in particular.

I do not know just how closely they are supervised now, but I know how close their expense accounts were supervised in years gone by, and I don't think anything has loosened up particularly in any of the states, and I am afraid we are going to hinder the regulatory men if we adopt this report.

Dr. Cotton: Mr. President, I feel as one of the State Regulatory men I should answer Dr. Gibson and state that in the past a great many of the state organizations have subscribed to from one to fifteen of the copies of the report, and in that way assisted this Association. If you do not feel that you can do this legally, and have your Board advance $25 annually as dues, you can advance $25 as a contribution and get in return sufficient numbers of the annual report to justify you in that action legally.

Dr. Ferneyhough: Gentlemen, I am going to tell you if a state is so cheap that they cannot come forward and contribute $25 for the benefit that they get out of this Association in that state and its representatives, too, then that state had better stay at home.

Now, this is an important question. We come here and spend anywhere from one to one hundred and fifty dollars, and we are here to learn something and absorb ideas, so to speak. We cannot do this thing without money.

This gentleman here who is in the position of Secretary and Treasurer says he has to borrow, he cannot even get out a decent report because he has not got the money, then are we going to sit back home and none of us contribute to do it? We are not expected to do it out of our pockets. Departments everywhere are bonding for this, that and the other; why not be more generous about this?

With all due respect to my good friend, Dr. Gibson, I take issue with him, I don't believe the states of the United States are so poverty stricken they cannot contribute $25 for the good they get out of this Association, and if they don't appreciate it any more than that, I can't help it, but if you go back and tell the State Department, gentlemen, what I tell Virginia, gentlemen, I cannot believe they would refuse that amount, tell them that you cannot come here and get anything of benefit from the Association unless you are going to do your part, that you want to do your part, and that you are bound to get something to take from the Association, and I believe if you look at it that way I don't think that $25 will not amount to a hill of beans.

I hope you will consider this thing carefully, don't drop it. You can't run this Association without money, and you cannot get it from selling a book. Of all the God-forsaken things on earth, it is a book agent, you know that. (Laughter.) Who wants our men to have to go out as book agents and sell books to get back here? Not on your life, no, sir, we want
to add dignity to what we are doing, we don't want to go backwards, but go forwards. I tell you right now on many of our doors in Richmond and other places we have a sign there reading "Book agents not admitted," in our State Department he would never even get in, no, siree. We have to have the money, and we had just as well get it in a good big way.

Dr. Cary: Mr. Chairman, this amendment is not mandatory on any one. If any state veterinarian cannot get this $25 from the State, he can pay $2 dues and still be a member of this organization. Let us get that clear. If he wants to pay $25 dues, all right. If he wants to work on his state board to give him $25 for this, all right, so much the better, it gives him an inducement to do that and help out the organization. Therefore, I see no objection to this because if the State cannot raise $25 it is simply up to the men to interest them to pay it.

Dr. Gibson: Mr. President, I desire to withdraw my sympathies from Virginia. (Laughter.)

Secretary Dyson: With reference to the suggestion of increasing our funds, by disposing of the Annual Report, that is a speculative business. I was speculating a little last year, and I had 100 extra printed, and hoped I would be able to dispose of them. I think there has probably been eight or ten copies sold up to date. I hope we will be able to dispose of the rest of them. We may have to reduce the price, but I am going to unload them on some one. I communicated with all of the State Veterinarians requesting them to order as many copies as possible, and we sold altogether $161.00 worth of the reports.

President Butler: The question before the house is the adoption of the report of the Committee on Policy.

Mr. DeVine: I move its adoption, Mr. President.

President Butler: It is regularly moved and seconded that the report of the Policy Committee be accepted. All in favor say aye. Contrary no. It is so ordered. Are any other Committees ready to report at this time? If not, we will proceed with the regular program. It is a Hog Cholera session this afternoon. The first paper is Source of Infection in Primary Outbreaks of Hog Cholera by Dr. Atherton of College Park, Maryland. Dr. Atherton.

SOURCES OF INFECTION IN PRIMARY OUTBREAKS OF HOG CHOLERA

By I. K. Atherton, College Park, Md.

A news item was noted recently, wherein it was stated that the U. S. Bureau of Animal Industry estimated the losses from hog cholera last year in excess of 2,250,000 hogs. As 90 years have come and gone since the disease which we know as hog cholera made its appearance in the United States, such facts are a sad commentary on the efforts of sanitarians and officials responsible for the protection of the swine industry.

With such appalling losses staring us in the face, it certainly is time that we take stock and determine just why, after its prevalence in the United States for nearly a century, hog cholera is still one of the most serious diseases of our domestic animals, with which we have to contend.
In this regard I believe that a careful survey of the subject will show that scientists as well as laymen have never realized the latent danger of the infection. Because of this, we have apparently been content to endeavor to combat, yes, even to trifle with the disease, rather than attempt to get rid of or to prevent it. As evidence of this, it is a glaring fact that methods of swine management are constantly practiced which are known not only to be responsible for starting new outbreaks of cholera, but for maintaining centers of infection as well. Sanitation, in the broad meaning of the word, all that can be done to promote health, is largely disregarded so far as this disease is concerned.

Many farmers or stock raisers feel secure from the dangers of the disease if they keep poke root, Venetian red or other home remedy in the swill pail. After the development of the anti-hog cholera serum and hog cholera virus, we find scientists joining the laymen in this, what might be termed contempt for the presence of the infection. At the first conference of State and Government officials, held to discuss the merits of the recently developed serum, a prominent veterinary official of that day made a statement to the effect that he found that after administering the serum and virus to swine he could keep them on infected premises without danger of their contracting the disease. That such proceedings were contrary to the principles of sanitation apparently did not matter. The ultimate results of our methods of attacking the malady are reflected in the news item heretofore mentioned.

That hog cholera infection does not appear spontaneously is an acknowledged fact. Experiments have been made that show under most conditions that virus will not remain long on premises after the affected hogs have died or recovered from the disease. Therefore, I believe it must be conceded that, excepting such premises as garbage feeding plants where the infection is constantly being reintroduced, there is practically not a county in the United States but that is free from the disease at least part of the year. If this be true, then the solution of the hog cholera problem is in preventing the introduction of the infection into free territory.

The possibility of accomplishing this will probably on first thought be received with doubt. This opinion is born of the idea that there is so much about the disease that we do not know. In this regard I am not familiar with another disease that has been surrounded with so much mystery as hog cholera. This state of affairs is largely if not entirely due to the lack of information regarding the source of infection in new outbreaks.

Exhaustive experiments have been carried out to determine the ways in which hog cholera is spread from the primary or new outbreaks to other premises. However, but few investigators have endeavored to find out the factors responsible for starting new centers of infection. Therefore, it would appear that the work in hand is to determine the agencies which are responsible for these new centers of infection.

To those who would collect data regarding the sources of infection in new outbreaks of hog cholera, I would say that it is not only the most interesting, but undoubtedly the most important part of field investigational work. It will be found so amusing as to never become tiresome, and so baffling as to tax the ingenuity of the investigator to the utmost. It
necessitates the employment of all the human senses. You cannot credit all you hear nor can you disregard all that is not told you. Often the owner or caretaker of the animals deliberately tries to mislead. In other cases the outbreaks are of such long standing that incidents connected with the source of infection have long since been forgotten and it is necessary to refresh the memory of the owner by suggestions as to what might have happened to bring the infection to the place. Then again, on other premises the animals receive such poor care and so little is known about them that it is impossible to get any information of value. Some of our experiences might bear repeating.

A case of hog cholera was investigated on a certain farm where there was a clear case that the infection was brought to the place by feeding pork scraps. After the farmer’s wife was advised of the diagnosis, and the source of infection, she said, “Oh, Doctor, I read your article on hog cholera, and do you really think that feeding pork scraps might cause the disease?” Gallantry forced us to tell the lady that we really had the World’s Series in mind when we wrote that article.

A lady with two children went from Maryland’s most populous city to visit relatives on adjoining farms in a distant part of the state. Pork loins were taken as presents to the families. No other pork had been brought on the places for several months and there were no cholera-infected hogs within 26 miles of them. On both farms there were two lots of hogs, but only one bunch on each place received garbage containing scraps or bones of the pork loins. These hogs developed cholera, while those that did not receive such feed remained well. It might be added that the children were afflicted with whooping cough and started an epidemic of that disease in the neighborhood.

Our work in one locality necessitated a visit to the premises of a colored sister. The swine population on the place consisted of one pig which, after apparently careful attention, had reached a weight of approximately 110 pounds at the tender age of nine months. Owing to the proximity of a number of hogs affected with cholera, vaccination was advised, which brought the retort, “Indeed they doan’ no white man do any of that vaccinating, whatever it is, to my hawg.”

Sick or Exposed Stock—It has long since been recognized that the introduction of sick or exposed hogs into susceptible herds was responsible for starting a certain percent of new outbreaks. There is no more certain way of introducing hog cholera than by placing an infected hog into a well herd. It must not be inferred that this means a hog clinically ill, but one bearing the infection in its body.

In Maryland, for a four-year average, this source of infection is apparently responsible for about 15% of the new outbreaks, hogs purchased from commission houses and peddlers being the greatest source of danger. In other states it may possibly be found that this is the greatest factor in starting new outbreaks. Especially in the Corn Belt it is the practice to ship in stocker hogs from stock yards as a means of disposing of the corn crop to an advantage, and many new outbreaks have been traced to this practice. It may be possible that many farmers have not been disheartened by these losses, which in the aggregate may have been small.
However, the infection, no matter how it may have been introduced into free territory, is capable of dissemination. We surely are inconsistent when we allow hog cholera infection to be spread by such means when under no circumstances would we permit an animal suffering with or exposed to foot-and-mouth disease to be moved into free territory or introduced into a well herd.

Abuse of the Double Treatment—In discussing this phase of the subject I want it distinctly understood that I do not want to reflect any discredit on anti-hog cholera serum and hog cholera virus when properly administered. Their immunizing properties are recognized and their worth has long since been proven. However, I do not know of any other biologic of proved value the use of which has been so abused as these two. There is no doubt that by the improper use or rather the abuse of these biologics hog cholera has not only been introduced into localities, but centers of infection have been perpetuated where the disease probably would not otherwise have obtained a foothold.

In Maryland the simultaneous treatment is wisely controlled and so far as starting new centers of infection is concerned, it appears to be a small factor. Only about 3% of our new outbreaks could be traced to that source. However, there is comparatively little virus used in the State.

Our most competent authorities are divided in their opinions regarding post-vaccination "breaks." Some insist that a large percentage are diseases other than hog cholera, while others maintain that they are all hog cholera. Although opinion is divided, to a certain extent it is generally conceded that some of them are undoubtedly hog cholera.

I believe one of the greatest factors in the abuse of the double treatment is its administration by incompetent persons. Just what might be considered competency in the administration of the double treatment is admittedly an open question, but I believe if competency is to be considered that laymen are certainly barred. That "breaks" do follow the administration of the treatment under the best of conditions is a well known fact. That there appears to be grave doubt regarding the nature of these "breaks" is sufficient argument why the virus should be administered by none but qualified veterinarians, so that if a "break" occurs the case may be in competent hands.

The demand for "farmer vaccination" in the central states must be considered with great concern, for it will undoubtedly prove a boomerang that will cost the farmers and stock raisers untold losses. Many serum companies have long since recognized this fact, and do their utmost to keep especially the virus out of the hands of laymen.

Other abuses of the double treatment that might be mentioned are its use in sick herds without proper diagnosis; its administration without every precaution being taken to prevent the spread of the infection in case of a hog cholera break; where by its use centers of infection are maintained; and improper care of recently treated swine.

An outbreak of hog cholera which is started by virus obtained in a bottle is just as dangerous to a locality as if the infection was introduced in any other way. Wouldn't it appeal to you that dissemination of the
disease by abuse of the double treatment is an inconsistency, especially when we will not permit scientists in this country to experiment with foot-and-mouth disease virus, even under ideal conditions?

Garbage Feeding—That the feeding of garbage is almost certain to start an outbreak of hog cholera in susceptible hogs is well known in certain parts of the country. This is due to the bones, rinds or scraps of infected pork in the garbage.

It is a common practice among farmers and stock raisers, when hog cholera appears in a herd, to cull out those that are fit and apparently well and either slaughter or ship them to market.

It has been demonstrated that there is a time, at least three days on an average, in the lives of practically all hogs affected with acute hog cholera, when the virus is in the blood, but they exhibit no symptoms of the disease and no lesions of the affection can be determined in the carcass. It is easy to understand that if infected hogs are slaughtered in that three-day period there is no means of determining that they carry the infection, yet uncooked portions of such carcasses fed to susceptible hogs will produce cholera. It has been demonstrated by Dr. Burch of Cornell that prolonged refrigeration will not affect the virus in such meat, and a representative sugar curing and smoking process killed it in only 43% of the tests made.

However, by garbage is usually understood the waste from the kitchen and tables of hotels, restaurants, and that collected by garbage wagons from city residences, but I am certain that the dangers of table scraps, kitchen swill, etc., containing bones, rinds and scraps of purchased pork, even on the farm, is much under-estimated; in fact, in most localities it appears to be entirely disregarded. Why scraps of infected pork used in hotels or restaurants should be considered more dangerous than that from the country home when pork is purchased for table use is not clear. If considerable quantities of virus were necessary to produce cholera, in susceptible hogs, the amount of garbage fed might be a factor, but an infinitesimal amount only is needed to produce the disease in such animals.

We have been surprised through our investigations in Maryland to learn the number of outbreaks of hog cholera, even on farms that are traceable to no other source than infected pork that reached the hogs via the swill pail. In fact, for a four-year average, we find that the feeding of garbage, table scraps or kitchen swill containing pork is responsible for 82% of the new outbreaks. Dr. Burch of Cornell states that at least 90% of the new outbreaks in New York are from this source. Before determining that an outbreak is due to this cause, we get a history that neither new stock or the double treatment could have been responsible for the infection reaching the hogs, that pork was undoubtedly purchased and there was a probability that scraps reached the hogs in some manner. When the final history of hog cholera has been written I am sure that the feeding of infected pork will be found to be responsible for a far larger number of outbreaks of cholera than most people imagine.

Where farmers cure and smoke their own pork, the supply often runs short early in the fall, necessitating the purchase of meat, mostly pork. Even though the supply of cured meat is yet abundant, the family after
eating cured meat for several months demand a change of diet and pork, usually fresh, is purchased for table use.

We are often at a loss to understand the apparent spread of hog cholera in the fall and blame it on to threshing or silo-filling crews going from farm to farm or other exchange of farm labor. But there is one point that we have undoubtedly overlooked. When such a large number of persons are to be fed the housewife is at loss to know what kinds of meat to serve. Beef, of course, is often placed on the table, but in the country district it is hard to obtain tender cuts of this kind of meat, and pork is usually purchased for one or more meals while the men are at the place. On most farms the hogs are used more or less as garbage disposal plants. When meat is trimmed in preparation for cooking the scraps usually are thrown in the swill pail and later reach the hogs. I believe this practice will be found to account for much of the supposed spread of the disease in the fall.

Claims are often made that unsterilized garbage may be safely fed to hogs if they have been immunized by the double treatment. For the sake of argument we will admit this to be true, however, in our experience, we have seen many “breaks” in garbage fed hogs where the double treatment had been administered under the most favorable conditions possible in such places. From a sanitary standpoint it must be admitted that it means the maintenance of a center of hog cholera infection for uncooked garbage contains hog cholera infection practically at all times. In a popular bulletin published a few years since, it was recommended that all hogs within five miles of a garbage feeding plant should be kept immunized by the double treatment. In a state like Iowa, this would mean that the owners of approximately 150,000 hogs, on an average, would be penalized because some individual elected to operate a garbage feeding plant. It might appear more sensible for each farmer to contribute one cent for each hog on his premises, the total amount to be given to the party with the understanding that he give us the garbage feeding idea and live on his income.

For the month of October, 1923, hog cholera was reported to exist on 150 premises in Maryland. Forty-four of these were termed backyard outbreaks. That is, a few hogs kept in small pens on lots in small towns or the suburbs of cities were affected. While the disease was reported to exist on 106 farms yet on only 26 of these were hogs bred and raised under farm conditions. In the other 80 cases the hogs were kept really under backyard conditions, and in practically every case received swill from the house. In 62 of the primary outbreaks on farms there was a clear history of pork being bought for family use and table scraps being fed to the hogs.

If infected pork be such a fertile source of new or primary outbreaks of hog cholera, then drastic action is warranted to stop the spread of the virus in such a manner. In foot-and-mouth disease work we take precautions to close every possible avenue whereby the infection might be introduced into free territory.

Our investigations in Maryland, covering a period of more than five years, have led us to believe that if you can get the history regarding the
source of infection in a new or primary outbreak of hog cholera, you will, without an exception find that one or more of the three factors noted, viz., infected pork, exposed or sick hogs, or abuse of the double treatment have been responsible for it.

In discussing the subject, with various parties, I frequently hear a statement to the effect that it is possible that in time we might find other factors responsible for the introduction of hog cholera infection into free territory. Assuming this to be true and even in view of the probability that we will find that there are other sources of infection, are we warranted in remaining inactive until such knowledge becomes available? I believe that we have already delayed action too long to the detriment of the swine industry.

In preparing this paper we hoped not only to create a discussion, but if possible to stimulate a movement to prove or disprove the statements made. If we have accomplished that we believe our efforts have been worth while, for the time has certainly come when we should be doing something in regard to hog cholera other than tabulating the amount of the losses from this disease.

If the factors mentioned herein are responsible for starting even a portion of the new outbreaks, then our course is clear. Let us take the term, "Hog Cholera Control," transpose it, and add the causative agent. We then have "Control of the Hog Cholera Virus"—the vital factor in combating the disease.

By the employment of the principles of sanitation, as far as we know them, it is possible to prevent the spread of the virus of hog cholera in the living animal, in infected pork and to control its movement in the bottle. The plan seems feasible and the cost would be slight compared with the enormous annual losses which hog cholera is now causing. Concerted action on the part of the Government and States is essential for the success of the undertaking.

President Butler: The discussion of the papers on Hog Cholera will be reserved for the last part of this program, so the next paper is by Dr. Cahill, Supplemental Studies of Post Vaccination Troubles. Dr. Cahill.

SUPPLEMENTAL STUDIES OF POST VACCINATION TROUBLES

By Edw. A. Cahill, V. M. D., Indianapolis, Indiana.

In a previous article we presented data which were obtained from investigations of post vaccination trouble cases. These data tabulated the results following the inoculation of susceptible swine with blood from animals which had sickened at varying periods subsequent to the simultaneous administration of hog cholera serum and virus. The inoculation experiments were conducted to determine whether or not the presence of petechia on autopsy justifies the prevailing custom of diagnosing a "cholera break" in previously vaccinated swine. The cases were typical of those which have occasioned unlimited discussion since some dogmatically diagnose cholera and advise retreatment whereas others adhere to the belief that many such cases are not cholera and that retreatment is not justified.

While a complete review of the investigations referred to above is not advisable at this time, a brief recapitulation seems desirable since they
are correlative to the statistics and opinions which are set forth in this paper.

Blood was procured from sick swine in one hundred fifty-two herds which had been simultaneously vaccinated at periods varying from four to thirty days previously and which were sick with what appeared to be an acute septicemia at the time of bleeding. Blood from each case was injected into two susceptible pigs to determine whether or not the filterable virus of cholera was present. The results demonstrated that virus was absent in 80.3 per cent and present in 19.7 per cent of the cases.

In a similar manner the blood of forty-eight swine which sickened more than thirty days after vaccination was examined. Of this number 31.2 per cent contained the virus of cholera while in 68.8 per cent it was impossible to demonstrate the presence of virus.

When swine become sick subsequent to vaccination there is a general tendency to consider the serum or virus culpable. For that reason the field results following the use of one hundred million cubic centimeters of anti-hog cholera serum and six million cubic centimeters of virus were carefully studied. This revealed the fact that the average lot of serum and virus was used in eighty-four herds. No trouble followed the use of most serial lots while one or two post vaccination trouble cases followed the use of a small percentage. There was, therefore, from 97 to 100 per cent satisfactory results in all cases.

Since petechia was the characteristic lesion of all cases examined our results were offered to substantiate the belief that petechiation is not sufficient evidence on which to base a diagnosis of hog cholera and that a large percentage of sickness following vaccination is some condition other than hog cholera. The existence of true cholera breaks following vaccination was verified but since the serum and virus used was capable of accomplishing the purpose for which they were intended in more than 97 per cent of the cases, it appears that some immunological factors as yet not appreciated, or technical details of administration are the causes of most hog cholera breaks.

Since the preparation of the article summarized above, these investigations have been continued. Blood has been procured from thirty-one additional cases in which sickness appeared in from four to thirty days subsequent to vaccination. The manner of procuring and handling the blood as well as the technique of inoculation has been the same in these supplementary examinations as in those originally reported. The inoculation of susceptible pigs with blood from these thirty-one supplemental cases demonstrated the absence of cholera virus in twenty-three cases or 74.1 per cent.

During the same time blood was procured from twenty-two herds in which animals sickened at periods varying from thirty days to one year subsequent to vaccination. In these cases thirteen or 59.1 per cent proved to be free from hog cholera virus while in 40.9 virus was demonstrated. It will be observed that in both the so-called “serum and virus breaks” the percentage of cases which proved to be cholera is slightly greater than was recorded in our original protocols. The variation is no greater than is to be expected considering the difference in the number of herds from which specimens were procured. The averages in our supplemental experi-
ments so closely corroborate those originally presented that they make
credible the attitude of those who at times diagnose post vaccination troubles
as something other than cholera.

During the course of these investigations there was sent to us blood
from nine herds in which the animals were not immune to cholera, and in
which some disease other than cholera was suspected. The blood from these
animals was subjected to the same inoculation tests as had been used in
supposedly immune herds with the result that five proved to be cholera
while four were negative.

A careful study was made of the history associated with the twenty-
three cases where the animals had sickened within thirty days and in
which our inoculations were negative in the hope that some constant factor
of diagnostic significance might be discovered. The records indicate that a
diagnosis of cholera had been made in one case before vaccination. Pul-
monary disturbances were present in nine cases either at the time of vaccina-
tion or autopsy, necrotic enteritis in four, and extensive parasitic infestation
in five. While these cases apparently strengthen our belief that post
vaccination troubles are increased by superimposing one infection upon an-
other it does not explain the four cases in which no pathologic changes
other than petechia were present.

The cases where cholera developed more than thirty days subsequent
to vaccination were likewise carefully studied. In eight of the nine posi-
tive cases our records indicate that at least a portion of the animals were
vaccinated when they weighed less than forty pounds. Unfortunately it is
not possible to obtain exact and dependable information regarding this
point and frequently the investigator has need for detective rather than
investigational abilities to obtain the desired information. Our study of
the records of these cases has caused us to feel that in many instances
only a portion of the herd would become affected and that if no treat-
ment were instituted the trouble would cease as soon as the susceptibles
became affected. In other words, it is believed that in many cases only
a small portion of the herd is susceptible and that this portion represents
animals which on account of their age or size at the time of vaccination
fail to develop substantial immunity. Further studies of the records indi-
cate that the amount of virus used may be a factor. It is significant that
in many cases the veterinarian insists that he used two cubic centimeters
of virus per animal whereas the records of the shipper indicate that he
did not purchase enough virus to permit of each animal receiving two
cubic centimeters.

Our belief as to the possible causes for the true “virus breaks” is
enhanced by the fact that the virus used in each case where cholera sub-
sequently developed was known to be fully virulent. Each lot of virus
which was used in the cases under discussion was tested for virulence at
the time of production and again at the period of expiration as given on
the label. Since each lot was found fully virulent at the time of both
tests there can be little question of its ability to stimulate active antibody
production. If, under these circumstances failure to obtain immunity is not
due to faulty technique, it would appear that some factor over which
the producer and the practitioner have no control is responsible for true "virus breaks."

In discussions following previous papers on post vaccination troubles some have expressed the belief that cholera virus must be the etiological factor since the losses cease when the herd is retreated with anti-hog cholera serum. We were aware of this condition since some of the herds with which we had been working had been retreated before our inoculation experiments had demonstrated the absence of cholera virus. In some, but not all, of these the losses ceased and the herd returned to normal following retreatment. It was quite apparent that we were not dealing with cholera in these cases and therefore there seemed need to investigate the possibility of protein stimulation being the factor with resulted improvement.

In an effort to determine this point there were selected twelve herds in which retreatment had been advised but in which there was reason to doubt the existence of cholera. The number of animals in these twelve herds totaled six hundred sixty-eight. One-half of the animals received anti-hog cholera serum in the amounts which would ordinarily be used for retreatment. The other half received plain defibrinated blood from hogs which had not been hyperimmunized but which had been vaccinated against cholera in the usual manner several months previously. To this blood had been added 0.5 per cent of phenol in order that the antiseptic content would correspond to that of anti-hog cholera serum. No effort was made to select the cases which would receive either kind of blood since each was used alternately. The results which followed were surprising. In ten of the twelve herds new cases ceased to appear in twenty-four hours after treatment. This applied to the animals which had received plain blood as well as those which had received anti-hog cholera serum. The total loss following treatment varied in all of the ten herds but in no case was the difference in plain blood and serum treated animals more than 2 per cent. In six of the ten herds the loss was heavier in the serum treated animals although the total loss following both treatments showed only 1 per cent difference in favor of serum.

Two of the twelve herds failed to respond to either of the treatments described and the loss in animals treated by each method was heavy. In one case the animals were retreated four times with anti-hog cholera serum. In the other the herd was retreated three times. In neither case did the treatments have any apparent effect.

It seems advisable to reiterate that subsequent animal inoculation tests proved that the virus of cholera was absent in all twelve of the cases in which this procedure was followed.

The success attendant with our first two experiences with plain blood caused us to realize either that the losses were about to stop when retreatment was administered or that, in cases which were not cholera, entirely satisfactory results could be obtained with non-specific treatment. It seemed advisable before proceeding further to determine what would happen to those animals receiving plain blood if they came in contact with cholera infection. To determine this, hog cholera virus was administered in five of the twelve herds referred to above. This was adminis-
tered alike to those which received plain blood and serum, and was ad-
ministered at the same time. The other seven herds received no virus.
There was no appreciable difference in the results where virus was used
and those in which no virus was used. Of the two herds previously re-
ferred to which did not respond to either treatment, one had received
virus and one had not. All other herds responded equally satisfactory re-
gardless of whether or not virus was administered.

The results which have been obtained naturally make us desirous of
investigating the value of alien proteins in those cases. This subject
is being studied at the present time.

The data which are presented corroborates the attitude of those who
believe that retreatment is not always necessary in post vaccination trouble
cases and that not all of those cases are cholera. The chaos which has
attended swine diseases during the past few years cannot be eliminated
unless we deal fairly with the problem. To do this we must realize that
“cholera breaks” have a tremendously dilatorius effect on cholera vac-
cination. When true “cholera breaks” exist the issue should be squarely
met regardless of where the blame may fall. Conversely, it is high time
that those who dogmatically diagnose a “cholera break” merely because
petechiae are present should realize that they are doing a tremendous
and unconfirmable injustice to the practitioner and to a valuable immuniz-
ing procedure.

President Butler: The next paper on the Hog Cholera program is
by Dr. H. A. Wilson, State Veterinarian of Missouri, State Sanitary Reg-
ulations for Hog Cholera Control. Dr. Wilson.

Dr. Wilson: Mr. Chairman, members of the Association, I have only
a very short article written on this subject, and with the permission of
the President and the members I would like to make a few additional
remarks.

SAFE REGULATIONS FOR CHOLERA CONTROL IN THE MOVEMENT
OF STOCK HOGS

By Dr. H. A. Wilson, State Veterinarian, Missouri.

Different states in this Union have their various types of regulations
which are enacted with the express purpose of controlling possible out-
breaks of cholera as a result of the importation or movement of stock
hogs. Conditions vary to such a great extent that necessarily regulations
must vary accordingly.

States where the use of virus is strictly controlled either by regula-
tions or statutory measures should have no difficulty in enforcing safe
regulations, as in those cases shipments from rural points can be attended
to by the veterinarian who performed the vaccination. Of course, we do
not need to worry about shipments which originate from the public stock
yards because those institutions are all under federal supervision, and
therefore are working under and in accordance with federal regulations
pertaining to this subject.

The regulations in Missouri can be considered practical and safe.
Briefly, they designate that shipments of hogs must be inspected and vac-
cinated by an authorized graduate veterinarian before they are moved.
However, there is a provision in the regulations whereby the State Veterinarian only has the right to issue special permit for hogs to move to destination with the understanding that they will be vaccinated there by a veterinarian whose qualifications are the same as those performing the vaccination before shipment.

It is only occasionally that we have any objections to these regulations. We find that the mortality suffered by purchasers under this system is slightly less than 4%, or in other words, slightly less than those which are vaccinated in the public yards under federal supervision. Occasionally, some fellow will ask special privileges in the way of wanting a permit to ship laymen vaccinated hogs, but it is very rare.

I consider that any state which is operating under the same conditions that Missouri operates under that would permit laymen vaccinated hogs to move on an owner's affidavit would certainly be jeopardizing the whole hog industry of that particular state. At least 98% of all hogs moved in Missouri are hogs that are moved through the medium of traders which not only includes those which come from the public stock yards but those shipped from rural points as well.

I realize that occasionally a straightforward, honest farmer who is properly qualified to do this sort of work vaccinates his own hogs and if the opportunity presents itself may sell those hogs to some feeder in a distant county, and it may seem like working a hardship on that particular man when we refuse to accept the shipment as vaccinated hogs, but as previously stated in this article, all hogs moved in Missouri under those conditions do not amount to 2%, if such a system were permitted.

Therefore in the movement of stock hogs, sanitary authorities should pursue the same course as pursued by the medical corps of the army. Past vaccination is totally ignored unless done by one who is authorized by the state or federal departments. For instance, in the average carload of stock hogs containing approximately 180 head, you will find hogs which undoubtedly originated from as many as 20 different farms, and if laymen vaccination is extensively practiced, that would mean that the vaccination had been performed by 20 different men. I think I am safe in saying that of all of the laymen vaccinating hogs there is not more than one in 20 who does the job as it should be done. Therefore, we will naturally assume that in this particular shipment we have 19 bad jobs and possibly one good one. It can be readily seen that to permit that bunch of hogs in question to ride on an owner's affidavit would be a very short-sighted and sloppy policy.

In fact, I would much rather have no regulations at all than regulations of that type. In conclusion, I want to say that regulations are nothing but precaution. The stricter the regulation, the safer the precaution. The more loosely formed is the regulation, the more inefficient and careless is the precaution. Therefore, the safest precaution that any state can take in the transportation of stock hogs are regulations which place the matter of vaccination and inspection purely in the hands of competent veterinarians, and in addition exercise a strict quarantine over incoming shipments for a period of at least 21 days.
If those measures just mentioned are resorted to and religiously obeyed as well as enforced with the same degree that an army regulation is enforced, there need not be any serious number of outbreaks of cholera resulting from the movement of stock hogs. Of course, it is timely to state that nothing should be left undone to properly instruct purchasers of such animals as to the proper method of feeding, as well as general sanitary measures which will materially aid in the localization of any cholera originating therefrom strictly upon the premises of the original purchaser.

Now, with the permission of the President, I would like to explain a few of the things that I mentioned there. Is it possible?

President Butler: Yes, certainly.

Dr. Wilson: What I stated about the layman vaccination. I can use as the best example the hogs as they are commonly handled in southern Missouri and northern Arkansas. I don't suppose there is one case in at least fifty where the owner who raised the entire lot of hogs sells them direct to a trader. If those hogs are purchased in lots ranging from anywhere from one up to fifty, possibly, or maybe one hundred, and in a great many instances those hogs are actually caught by the aid of dogs—in other words, when a northerner comes into the community and purchases hogs he hunts him up a trader, and they go hog hunting.

Now, in loading their hogs from points in southern Missouri, such as West Plains, Willow Springs, and those points, we pay absolutely no attention to any history of past vaccination unless it happens to be some farmer who has his farm fenced in and a certain veterinarian who is authorized by the State Department, has immunized those pigs. Then they are required to write an ordinary health certificate on them certifying that the pigs are healthy and free from any disease at the time of shipment.

As to the post-shipment troubles, they are largely dependent upon two factors: One is the type of hogs as well as the proper type of vaccination that was performed and the other is the manner in which the hogs are handled after they arrive upon the owner's premises.

Now, we occasionally find that hogs shipped from public stock yards where the work is all done entirely under federal supervision suffer greater losses than those hogs which are purchased from rural points. I am not casting any reflection whatsoever upon the federal men in supervision or their work, but I do say that I think in some cases that the serum which is used on those shipments is entirely too old.

I know of one case up near Liberty, Missouri, where a man purchased a lot of stock hogs. These hogs broke badly, and they broke in about ten days. The serum company agreed to furnish serum for re-vaccination, which they did, and the owner informs me by mail that the serum which was furnished for re-vaccination, that he saw on the bottles what the expiration date was, that is, that the date had expired. Now, evidently the serum that was furnished that particular individual was furnished him purely as heart balm and not with the intention of doing him any particular good.
But in most cases the results obtained, whether they are rural shipments or stock yards shipments run about the same. In other words, they range from three to four per cent mortality, which I consider is a very low percentage, considering the fact of how those hogs have been handled.

I have said nothing in this paper pertaining to the proper disinfection of local stock yards and of stock cars, such as lining the cars with paper and spraying the hogs and all that sort of stuff. I do not consider that it needs any particular thing said about it, for the simple reason that any sanitarian or any veterinarian who knows anything whatever about hygiene should understand how to instruct the purchaser in all those various details, and I don't believe that any real code of rules is necessary. Our regulations specify that the car shall be clean and disinfected and that is all that is said.

I have enjoyed the papers which have preceded this immensely. I am not attempting to discuss those papers, but in this connection with this paper here there is a portion of Dr. Atherton's paper which I wish could be published in every live stock paper in the United States, and that is the paragraph dealing with the subject of layman vaccination. I don't think there is any doubt but what next to the improper transportation of stock hogs, that virus is responsible for practically most of the artificially inoculated outbreaks. Thank you.

(Applause.)

President Butler: The next paper on the program is the report of the Committee on Hog Cholera Control, by Dr. Stange, the Chairman of that Committee. Dr. Stange.

Dr. Stange: Mr. Chairman, Gentlemen: Your Committee has nothing especially new to offer, but this Report consists of some suggestions along lines which we think some progress may possibly be made.

REPORT OF COMMITTEE ON HOG CHOLERA CONTROL

The report submitted last year attempted to analyze the situation as it existed at that time and it was the plan to make some definite recommendations in regard to hog cholera control work this year. One important point, however, has never been determined by this organization, i.e. whether we should proceed with swine vaccination as a sanitary control measure under official supervision or should it be applied as an insurance feature and left largely to the discretion of the owners.

The Committee desires to call attention, first of all to some things which we deem of importance in connection with hog cholera control. A number of points having a practical bearing cannot be intelligently determined without additional information. Sanitary officials can be of material assistance in gathering this information. We hope that sanitary officials will keep some of these things in mind and endeavor to obtain somewhat more definite information in regard to hog cholera than is now available.

One of the most important questions at the present time is whether or not, under practical conditions, suckling pigs can be actively immunized in a satisfactory manner. There is experimental evidence to show that
this is apparently being successfully worked out and it may be not only a means of further controlling hog cholera by doubling the number of immune animals but may be a means of reducing other infections which sometimes develop after vaccination. If such a procedure is possible it would not only stimulate a more extensive use of serum and virus, owing to the reduced cost, but it would prevent a great many outbreaks of hog cholera by increasing the number of immune herds. If it is to be an accepted policy to utilize vaccination for hog cholera as an insurance feature, its value could be greatly increased if pigs from two to six weeks of age could be safely immunized.

Your Committee would also like to call attention to the present practice of simultaneously treating animals in stock yards before they are shipped out for feeding purposes. There are some reports to the effect that a considerable percentage of these animals later show bad effects of such treatment. It is but reasonable to suppose that a hog should receive better care than it is possible to give him while in transit, during the negative stage after vaccination. Whether a serum alone treatment in the yards and later simultaneous treatment on the farm is advisable can be determined only after comparison of the increased saving in hogs and the increased cost due to two treatments as well as preventing new centers of infection.

The third item which your committee desires to call attention to is the cause of primary outbreaks of hog cholera.*

Finally, your Committee wishes to recommend that this organization provide means in cooperation with the sanitary officials of gathering statistics on the various animal diseases. It is very difficult to determine how much progress, if any, is being made without more reliable statistics.

President Butler: The papers on hog cholera are now open for discussion.

Dr. Ferneyhough: Mr. President, I want to ask Dr. Atherton whether laymen are allowed to use the anti-hog cholera serum in Maryland.

Dr. Atherton: They are permitted to use the hog cholera serum, yes, sir, but not the virus.

Dr. Ferneyhough: I understood you to say very little virus is used in your state.

Dr. Atherton: We have about 48,000 farms in the state and if I have the correct information at hand, there were about 300 farms on which virus was used in 1922.

Dr. Ferneyhough: Then, if I understand you, if I do not correct me—very little virus is used in the state of Maryland and laymen are allowed to use serum. If that is the case, gentlemen, it is very plain to me why you have got so much cholera there.

Now, as a matter of fact, if we are going to go back and commence to look around and settle an old trouble by shooting the buzzard and tying the dog and not use any garbage to prevent hog cholera, we are getting away from our present scientific method of preventing contagious and infectious diseases. Take the recent world war, look how little typhoid fever we had in it in comparison with 1898, in the Spanish war; we were
doing boiling then and doing everything then, but here in this case we used a treatment to prevent it, we did not bother about infection anywhere, but the medical fraternity used a vaccine to prevent it.

Is the veterinary profession going to come here in this session—I don't hesitate to say the largest live stock sanitary association in the world—and going to recommend that you must prevent cholera by not feeding any garbage, a food that is very essential and very cheap in fattening hogs? Are you going to throw it away because you are afraid of cholera? Why, no, we are not going to do it.

Why, gentlemen, as a matter of fact, we have some men in Virginia who are very successful in feeding garbage, but they would not dare feed it without first having some competent veterinarian immunize their hogs and then go ahead and use the garbage.

When we have an outbreak of diphtheria do you suppose the doctor is going to bother trying to find out where the diphtheria started? Certainly not, they will use the anti-toxin. Are you going to tell anybody he must not let his horse get a nail in his foot for fear of tetanus? No, as soon as he gets a nail prick in his foot you are going to use anti-toxin.

Gentlemen, professionally it is not time for us to be turning back to the old talk about meat scrap; that is all over. I hear that kind of talk when I go out to see the farmers, but I don't enjoy hearing it in an official paper here.

Now, as a matter of fact, we have got to keep abreast of the times, when it comes to our scientific purpose, I don't mean putting anything over anybody, not on your life, but, gentlemen, the treatment for hog cholera has been tried out, there have been breaks and all that, but I tell you when serum and virus are obtained from a reliable commercial firm and properly used the results have been wonderful and we must stand by it.

If you take the different commercial firms all over this country, some of them might be unreliable, some might be speculative, I don't know about that, but I tell you the majority of them are all right. I have not gotten to the point in life where I feel everybody is crooked and I believe the majority of our people are honest.

If you talk about not feeding garbage and that sort of thing, it seems to me you are slapping the simultaneous treatment right in the face. I don't mean to be personal, and I don't mean to be severe, but I cannot agree with Dr. Atherton.

Garbage is a by-product of all the meals, gentlemen, from all of the foods, and I tell you it is a valuable by-product, something that years ago was thrown away.

Are you going to throw it away and burn it up when lots of people can take it and develop the cheapest kind of pork? Not on your life, we can't afford it; I simply cannot agree with the gentleman from Maryland. (Laughter and applause.)

Dr. Atherton: Mr. President and Gentlemen: The gentleman from Virginia said he listened to my article, but I think he surely did not catch me. I will leave it to any gentleman here, did I say anything about not feeding garbage? I said keep the infected pork rind out of the garbage.
He says that Maryland has hog cholera and Maryland is the one state in the 48 that has any data on that hog cholera, on how hog cholera operates, and we appreciate Virginia’s method of handling this problem. In May a couple of Virginia gentlemen came over to Maryland and purchased a lot of 300 hogs and took them home, and started them on garbage and something went wrong, and they are broke now.

Gentlemen, I defy anybody to point out where I said one thing against the serum and virus treatment, or that I said one thing against garbage, but, gentlemen, speaking about the wonderful feeding value of garbage. Do you know it takes a ton of garbage to make forty pounds of pork? Pork is worth seven cents a pound at the outside today; that is $2.80 for what you get from a ton of garbage and running a risk on feeding it.

Why isn’t it reasonable if you are asked to throw it away? If you will investigate from the standpoint of the technical man the disposal of garbage by feeding it to hogs, you will find it has nothing to recommend it, and if all the people who have tried garbage feeding, there are very, very few who ever made it pay, compared with the larger per cent that have tried it and failed and went broke.

Gentlemen, my points were these: Stop the movement of the virus in the infected hogs, in the living hog, in the infected pork, and control its movement in the bottle. I cast no reflection on any commercial firms, I cast no reflection on any method of feeding garbage to hogs. I don’t believe the gentleman caught it. (Applause.)

Dr. Fitch: Mr. Chairman, one or two points in Dr. Ferneyhough’s talk I think need correction, that is, when he compares the use of anti-hog cholera serum and virus with the use of typhoid vaccination in the army or with the use of other serums or anti-toxins of which he spoke.

It is very true that the statistics coming from the late war definitely show that the typhoid rate in the army was exceedingly low, but typhoid vaccination is a very different form of vaccination than that which is used in the simultaneous treatment of hogs to prevent cholera. And, furthermore, if you will look over the reports of the Surgeon-General’s office you will find that they are not letting down one bit in the case of sanitary regulation and control which carried the soldiers through the army. They not only had their sanitary regulations as strict as they could make them, but they added to it this typhoid vaccination, which consists of the use of dead organisms and that there is absolutely no danger of the transmission of the disease by this method, and if you have only listened to the papers here this afternoon you will realize that in the use of the simultaneous treatment for hog cholera that there is some danger of the formation of new centers of disease following the use of this treatment. (Applause.)

Dr. Wilson: I would like to be permitted to say a few words. Now, the remark I made about not agreeing with Dr. Atherton, I do not want the doctor to think I was aiming to impose upon him. Conditions may be different in Maryland from what they are in Missouri.

In Missouri they seldom buy meat, it is not a matter of a farmer running out of meat, and therefore they do not buy it, and I do not believe that the pork chops, or, in other words, say, refuse of the hog, has any appre-
ciable bearing on the outbreak of cholera. The average Missouri farmer has a little meat to sell along in the fall. Furthermore, with the exception of some very low, degraded, ignorant, rabbit choker, you will not find any man on a Missouri farm killing a sick hog. (Laughter.)

Now, then, if pork products are capable of distributing hog cholera, and I am not going to dispute Dr. Atherton's words, as I believe probably they are as his experience demonstrates, but I will say if they are, I will say 95 per cent of them are products that come from federal inspected packing houses, being under the federal government's regulations, hogs showing slight lesions of cholera, or at least those that have been exposed to cholera are permitted to go as fit for human food.

Now, if this is a factor that amounts to anything it is a very easy matter for the federal government to enact a regulation whereby those products must come out labeled and that will head off trouble from that source.

I was very much interested in what Dr. Ferneyhough said regarding this old shoe and the buzzard and tying up the dog stuff. I know that buzzards can convey hog cholera. As far as that is concerned, there is a minute animal commonly spoken of as a certain urinary ant that also conveys it. (Laughter.)

The old theory that hog cholera and many other animal diseases as well as human diseases can only spread from body to body or be conveyed by some intermediate agent appear to me as only ridiculous. Now, this may shock some of our bacteriologists and if they want to classify me as an ignorant jackass I am perfectly willing to assume the obligation (laughter), because I come from a state which is noted for the production of those animals.

I distinctly remember a case in 1914 when you remember that a large outbreak of cholera took place, where a certain old gentleman called me to investigate his hogs. He had approximately 125 head. There were 40 of them very sick hogs, and I talked him out of wasting any money on those particular forty hogs. I advised him to kill the hogs and burn them up. He could not see it that way, so he placed them over in the orchard, and he was very particular about having the tubs and pans and those things disinfected. He also was a buzzard shooter.

Now, this old gentleman lost all but one of that forty head of hogs; he burned every hog as quickly as possible. After the mess was cleaned up upon his premises and he plowed that orchard just as deeply as a man could put the plow.

In 1921, just a short time before I went to Jefferson City, this old man's son called me to see his pigs, pigs ranging in age from two weeks to a month old. Out in Missouri we consider that it is a waste of time and a waste of money and a display of assinine characteristics to attempt to immunize a pig of that size. (Laughter.)

I held post-mortems on three or four of those pigs, and I found that they had cholera. I gave the same serum treatment, and the cholera stopped.
Now, it might be of interest to you men to know that at that time there was not a single outbreak of cholera within twenty miles of that place. Furthermore, the mothers of these pigs were descendants of Dr. Butt's pigs, and they had snouts like that (indicating), and they were rooting around. Now, I will put it up to you veterinarians in this house, where did those pigs receive that cholera infection? Was that infection lying dormant there for seven years or was it conveyed there by a buzzard?

If infection is capable of lying dormant in the ground for seven years and suddenly bursting forth, who knows but what it can lie there a hundred years, and I believe if there was some way of making a careful survey of soil conditions in the United States you would find that hog cholera infection and various other types of infection are capable of living in the soil and are prevalent just to the same extent as tetanus infection is, and all it takes is that some rooting occurs, or some other conditions, and it will revive this infection and stimulate it and it becomes virile. I cannot get away from that theory.

Now, as a practical measure in the control of hog cholera in the middle west where we raise corn, where we raise hogs and where we don't get enough hogs to eat the corn, and when we have to ship in hogs, I ask you in the following words: What in the hell is the average farmer going to do? Is he going to curtail his business activities and listen to a bunch of fellows who sit up at a mahogany desk and tell him how to disinfect the old sow's breast before the pigs suck at it, or try and go to the point so many farmers have gotten to today, or can he resort to practical measures, as Dr. Ferneyhough stated in his talk, and make his pigs pay the mortgage off his farm? I thank you.

(Applause).

President Butler: Is there any further discussion on the papers regarding hog cholera?

Dr. Burch: Mr. Chairman, I would like to ask Dr. Cahill what percentage of the pigs that died after receiving the serum and blood treatment, and what the lesions were. I think it would be interesting to know what the lesions were.

Dr. Cahill: I tried to bring that out, but it would be impossible to cover it in detail without going into it at very great length, but pulmonary or intestinal diseases were present in almost every case.

Dr. Burch: There are one or two points in regard to Dr. Cahill's paper that I would like to call attention to. I think Dr. Cahill is to be commended for going ahead and getting the data that he has and bringing it before this Association. It gives us a slant upon the causes of hog cholera and that we need.

I think there is one point in regard to the interpretation that Dr. Cahill places on his results, and that we want to accept, I would say, with some caution; all of us know that when we use serum and virus we know what we expect ultimately, and what do we get in the vast majority of cases? We get the destruction of the hog cholera virus.

For that reason, and because of the well known history we have of the spread of hog cholera as a result of these breaks, I would not want
personally to assume that in, we will say eighty per cent, or whatever per cent Dr. Cahill mentioned, that that eighty per cent is really free from the virus, or that the virus has nothing to do with the break.

And another thing, and it is important, in regard to the interpretation of these results, it is connected with the time that elapses between the simultaneous treatment and the time these lesions occur. He has placed that at one month in making his determination, I believe. Does that mean that this herd has been under close observation by a person competent to make these observations during the interval between the time of the simultaneous treatment and the time the break is reported? There is a great deal of difference between the time a break occurs and the time it is reported.

Another thing is the clinical history of these hogs. If there is a febrile disease appearing say two weeks or three weeks following the simultaneous treatment in a considerable number of hogs, with a negative finding there with respect to the virus. It should be accepted, I think, with some caution.

The data, as I say, are very valuable, and it is a fine thing to bring them before the Association, but I think we want to consider the history of the breaks as they occur, and we will try to guard against them by observing our hogs very carefully, and we should be telling our clients there is possible danger ahead and that if the trouble comes, if you tell him you do not believe the virus had anything to do with it, a good many times this man has another thought coming, if he does not express it in your presence he expresses it elsewhere.

In dealing with virus as it disappears from the blood there are factors that enter into it and are important and all of us should take them into consideration in conjunction with interpreting for ourselves the data Dr. Cahill has presented here today.

Dr. Craig: Mr. Chairman, it is a fine thing for us to discuss among ourselves the break following vaccination. We should be careful, however, and not confuse the vaccine reaction any more than it is already confused in the diagnosis of hog diseases.

We have a hog cholera serum, a very safe vaccination for hog cholera at the present time, and it is a great mistake to allow any herd of hogs to die following vaccination just because we question whether it is hog cholera or not.

I have seen some very serious losses; I have seen some serious results occur in our state because the vaccination for hog cholera was delayed until the disease had appeared in the neighborhood and spread.

This fall I have been out among the veterinarians a great deal and I find they are very much confused in regard to diagnosing hog cholera, if there are any blood lesions present.

We have done considerable inoculation with blood from hogs that have broken following vaccination. I may state this year and last year, and for four or five years we have found very, very few serious breaks. I have only noticed two serum breaks this year, and in no case was it a serious matter. We have had a good many virus breaks, and I am free
to confess that personally I cannot explain these virus breaks. I have looked over the temperature charts of the companies who furnish this virus and the charts did not show the requirement.

During the last seven or eight years we have collected samples of blood from something like fifty herds that broke following vaccination. I cannot give you the exact number of hogs, I do not have it available, but in fully eighty per cent of these cases these breaks proved to be not cholera, and I must repeat again that we must be very careful about confusing our progress in relation to diagnosing hog cholera.

I have in mind one particular herd. This occurred on a farm, and this man lost about twenty or thirty hogs and he diagnosed it as reptilian. They had already used vaccination and still the hogs continued to die, and we visited this herd and seven post-mortem examinations were made. After finishing the post-mortem examination we asked the local veterinarian what he would call these lesions five or six years ago. "Why," he said, "hog cholera." "Why don't you call them that now, what is the reason?" And that is the reason why I say we must be very careful in diagnosing diseases we do not know the nature of, if there are such diseases, before our practicing veterinarians, and avoid confusion.

In certain sections of our state they have had no hog cholera, some of the people say ever since they can remember, at least twenty-five or thirty years. These people do not bring in feeding hogs, all of the hogs are shipped out of this section for feeder purposes and they slaughter a good many hogs as well.

Now, if pork is a prolific source of hog cholera in our state I am not aware of the fact. I mean cured pork waste that gets into the garbage. These people down in southern Indiana eat a great deal of pork; much of this pork is purchased from large abattoirs. There is an agency of the packers in these towns and many of the farmers do not kill their own pork, so that much of this pork comes from the large abattoirs, and if it was a prolific source of hog cholera in these sections then we would experience outbreaks there just the same as you have experienced outbreaks in other sections of the State, and they do not occur.

I am very sure that hog cholera serum and virus have done a good deal for the hog industry in Indiana and in spite of the fact we occasionally have trouble I am satisfied with the results we are getting in our state.

Dr. Houck: I have been very much interested in the remarks that have been made in regard to hog cholera and we have been particularly interested in regard to the sources of the infection and to what extent the disease is conveyed by garbage and I have just risen to ask Dr. Burch whether he would tell us something about what their late experience has been in New York State in regard to that source of infection.

Dr. Burch: The experience has been pretty much as it always has, that something like ninety per cent of the outbreaks that come under our observation are traced directly to this source. At least they have that history.

Dr. Torrence in Canada has had the same experience.
I do not think we want to assume that what takes place in Missouri or Kansas, or Illinois, or any of the corn belt states is true in the East.

I don't think there is any doubt but what the vast majority of the outbreaks there come from the shipping in of infected hogs, whether they are simultaneously treated, or whether they happened to be infected when shipped, but it is certainly true in the eastern states that these outbreaks that we come across are nearly all traceable—that is, the primary outbreaks—are nearly all traceable to the garbage feeding.

I remember of one instance on a farm which is several miles away from railroad transportation at—it was isolated and we found an outbreak of hog cholera there. The man had about 100 hogs, and I traced up the history and we found no satisfactory explanation of the outbreak. I inquired carefully about the purchase in the market and he had not been a purchaser; in the course of a week I received a letter from Dr. Friend, who was the attending veterinarian, and it turned out that there were two little pigs that had had the run of the farm. They would break through the fence and they went any place they pleased, and these pigs were the ones that were first infected. That these pigs had been in the habit of going to the hen house and helping themselves to pork trimmings that had been purchased at the local meat market. They had contracted the disease and passed it on. But that is rather an extreme example of it. We have had plenty of them, and it is not a theory that hog cholera starts frequently that way, it is the fact in the east and under eastern conditions, and it can be verified and that is the source of the majority of the attacks.

Dr. Ferneyhough: Mr. President, may I ask Dr. Burch in order that I may not be misunderstood, because I certainly don't want to be unfair to Dr. Atherton, but what I wanted to ask was had those hogs had the simultaneous treatment?

Dr. Burch: No, they had not. The only point I had to make is this: The farmer is so peculiar about doing what he is advised to do about preventing disease, I don't want him to get away from the simultaneous treatment, and my belief is, and I don't think there is any doubt about it, that garbage is a source of infection absolutely, but if the simultaneous treatment is properly administered, can you then feed garbage? That is the only question.

Dr. Ferneyhough: These hogs that you speak of had not had the simultaneous treatment?

Dr. Burch: The point is this: I think a great deal of our argument here is entirely unnecessary: Controlling hog cholera in Missouri and Kansas is entirely different from controlling hog cholera in New York or Virginia, because you are working under entirely different conditions, but we wouldn't advise the average farmer in New York, whose herd is fairly well isolated, who keeps just a few hogs, to use the simultaneous treatment, because when they are a long ways out we have to consider that and the cost amounts to something when he has only two or three hogs, and has to stand the cost of vaccination. We do advise everybody who is shipping in hogs or who is changing, or buying and selling. We advise people of that kind to use the simultaneous treatment. There is no
question about what it will do but we don't advise the farmer in New York to treat his hogs, and I don't think there is a man here who if he were to go under those conditions who would advise them to vaccinate. There are some places, we will admit, where it seems to be the only thing to do. It is like everything else, we have to use it according to its indication.

Dr. Simonson: I would like to say a few words on this. We have listened to the paper by Dr. Cahill, and I think the work he has done is of great importance, but I would like to ask him if he had any control of the administration of the serum and virus. Did you know that each of the pigs that blood was taken from had received a definite dose of serum and virus? Did you know that the pigs were healthy at the time of vaccination? Did you know as to how those pigs were cared for afterwards?

Dr. Cahill: Gentlemen, I tried to make that point clear in my paper. I said it frequently required a detective rather than an investigator to determine those points. To me it is a very peculiar circumstance that every time there is a break, or so-called break in hogs subsequent to vaccination, the technique of vaccination was absolutely perfect. You find a case but what the history indicated an absolutely perfect technique in spite of the fact, as I mentioned before, that the veterinarian did not receive as much virus as he said he used. It should be understood that we had in most instances only the report, or vaccinating history furnished by the veterinarian and by the owner. As I pointed out in my paper if we could uncover any constant factor which would account for the conditions and the results we described in the paper, it would be of great practical importance.

Mr. Chairman, just one other point, I do not want to run the risk of being considered radical, and I know Dr. Birch did not mean his suggestions in that way, we have intentionally called attention to the fact that a certain percentage of post-vaccination cases are true hog cholera, because at the same time we intentionally point out the fact that all post-vaccination cases are not true hog cholera.

There is a circumstance not brought out in the paper which perhaps would help clear the situation, which is this: I know that perhaps Dr. Birch had in mind, that some of these animals might have been carriers of hog cholera and not transmitted hog cholera to the inoculated animals. To try to determine that point for ourselves we intentionally caused pigs to sicken by giving a certain number of pigs graduated doses of virus and serum. When we inoculated susceptible pigs with the blood of the sick pigs we did not fail in a single instance to produce cholera and we felt under the circumstances that we were reasonably safe in drawing the conclusion that we did.

The other point mentioned by Dr. Birch, the time, is gone into quite thoroughly in our first paper on this subject. You may remember the length of time elapsing between vaccination and sickness subsequent to vaccination were covered in protocols presented in that paper.

In regard to what Dr. Craig has mentioned, I know that it is true there have been many cases of that kind in Indiana and other states. Diseases other than cholera are diagnosed when the trouble really is cholera. The
result has been heavy and unnecessary loss. However, the opposite is also encountered very frequently.

About six weeks ago a veterinarian not more than fifty miles from Lafayette reported he had a hog cholera break. It came to my attention and I sent out a field investigator to study the case. He and the veterinarian who did the work decided the hogs did not have cholera. They were being improperly fed, and were taken out of the new corn and put on proper range. The next morning several more were ill. Another veterinarian was called into consultation. He threw up his hands and said, "hog cholera." The original investigator man went back again, and when he got there about fifty per cent of the herd had been treated with hog cholera serum. The proposition was made to the farmer not to treat the balance, and the investigator would pay for the ones that died. That is six weeks ago, and there are no hogs to pay for. In such cases the serum is unjustly accused of not accomplishing the purpose for which it is intended.

Dr. Birch: In regard to the manner in which Dr. Cahill controlled the elimination of this virus, what was the procedure?

Dr. Cahill: A number of pigs were given hog cholera virus and serum. The latter was administered in graduated doses ranging from two centimeters up to twelve. When pigs were inoculated with the blood of the test pigs which received insufficient serum they invariably sickened.

Dr. Birch: Yes, but you have your omission there, Dr. Cahill, when you administered smaller doses of serum, and had given them a dose of serum that ordinarily takes care of the sickness.

Dr. Cahill: I know of no other way to try under similar conditions.

Dr. Birch: The point I make is that these experiments, this data you have given, and I have the greatest respect for your data, I am a little bit cautious about assuming that the percentages that you give would be correct if we went back and really could determine it.

Dr. Cahill: Perhaps not. I cannot answer that, since we have not been able to determine the cause.

President Butler: The report of the Committee on Hog Cholera Control is before you for your consideration. What do you wish done with this?

A Member: I move its acceptance.

Another Member: I second the motion.

President Butler: It has been regularly moved and seconded that the report of the Committee on Hog Cholera Control be accepted. Those in favor please say I. Contrary, no. It is so ordered. We want to clean up some of the Committee reports; before we take up Nutritional Diseases. We would like to have the Report of the Secretary, Dr. Dyson.
TWENTY-SEVENTH ANNUAL MEETING

REPORT OF SECRETARY-TREASURER, 1923

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President Butler: Gentlemen, when you look over that report and look at the figures you will say your Secretary-Treasurer is deserving of a great deal of credit. As Dr. Dyson mentioned this afternoon the 1921 meeting cost a little over $1,800. This meeting cost about $800, that is for this year, making a saving or a difference of a little over $1,000 between the meeting of 1921 and the meeting of 1923.

I appoint Dr. Crew and Dr. Pearce as a Committee to audit the Secretary's report and report tomorrow.

The next on the program is the subject of Nutritional Diseases. I am sure you will find this very interesting to you. The first paper is Nutritional Diseases of Cattle and Swine by Dr. H. C. Kernkamp, of the University of Minnesota.

NUTRITIONAL DISEASES OF CATTLE AND SWINE

H. C. Kernkamp, Division of Veterinary Medicine,
University of Minnesota.

In the light of our present knowledge it is difficult without fear or favor to place any great number of live stock ailments in the category of nutritional or deficiency diseases. A renewed interest in this phase of veterinary medicine, animal husbandry and nutrition has developed within recent years.

Much work has been done on the separation of the nutritive constituents of our foodstuffs. In general, these include the proteins, carbohydrates, fats, inorganic minerals and the vitamines. Water should also be included although it is not considered a nutrient, yet a deficiency of water.

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will result in disaster. The effect these have upon maintenance, growth and reproduction have been studied quite extensively on laboratory animals. Similar trials with our work and food producing animals have only been carried out to a limited extent.

Unfortunately deficiency diseases are not usually recognized until the disease has progressed to a more or less serious stage. Even then, if only one animal be affected, it frequently goes unrecognized. On the other hand, where herds or flocks are involved, either one or only a small number of individuals will show evidence of disease at the outset, though all the animals are kept on the same diet. This can best be explained on the probability of individual idiosyncrasy regarding its reaction to the deficiency.

Calcium and phosphorus are two of the minerals that have important places in the cause of deficiency diseases. The effect on cattle and swine of the lack of one or both of these elements is partially understood. The shortage or absence of these substances is followed by certain quite definite clinical phenomena. For example, certain paralyses, stiffness, lameness, skeletal deformities, fractures, convulsions, digestive syndrome, perverted appetites and diminution in milk flow are associated with mineral deficiency. Some investigators have observed that sterility and abortion at times have been the result of a lack of adequate mineral matter. Some of these phenomena occur as definite entities, while others are developmental stages in the course of the disease.

During the last spring and early summer in Minnesota, a number of reports and inquiries were received relative to a disease in cattle characterized by perverted appetites. As a result of a preliminary investigation, it was found that certain phases very closely concur with what is reported by Tuff in Norway as osteomalacia and by Theiler in South Africa as pica.

The outstanding symptom in these cases is a craving and perverted appetite. Occasionally one finds an animal with a much reduced appetite. Affected animals will eat and chew upon such things as bones, wood, earth, stones, manure, cloth, leather, tin cans, etc. Unthriftiness and emaciation are evident. The skin is dry and coarse, the hair is harsh, rough and shaggy. They are slow and sluggish in their movements. Some individuals have an anxious and wanting expression about the eye. Enlargements about the joints are often noted. Fractures are not uncommon. Some European writers have reported that a deficiency of mineral matter has resulted in retarded estrum in some heifers, and in others the estrus cycle does not commence until after the deficiency has been supplied.

In the South African and Norwegian investigations, the disease was pretty generally confined to certain regions. This has also been observed in Minnesota. The particular season of the year when the greater number of cases occur is in the spring, or the time following a long period of stall feeding. It is also claimed that the years following drought are times when the disease occurs with greater frequency.

It is evident that animals depend on their foodstuffs to furnish them the necessary inorganic salts. Therefore, if the food does not contain sufficient minerals, the animals will suffer from lack of such substances. Soil which is deficient in certain minerals will produce crops, which have
a like deficiency. That the soil and hay in districts where this disease exists, contains less calcium oxide and phosphoric acid than the soil and hay from non-affected areas is shown in reports from New South Wales and from Norway. These reports and also the work of Theiler indicate that phosphorus is likely to be the more important factor in the cause of this disease. Calcium, on the other hand, cannot be excluded.

Definite knowledge regarding the specific remedial and control measures is not available. However, considerable evidence points to the fact that effective preventive measures can be carried out. Eckles in Minnesota states that on farms in the affected areas, where bone meal or rock phosphate was a part of the ration, this disease was not noticed. Similar statements are made by Theiler and also by Tuff. Tuff recommends that fields and pastures in affected districts be manured with the mineral substances that are lacking. Bone meal, bone flour or ground bone, fish meal or calcium phosphate are substances that can be quite readily obtained and should be added to the ration wherever this disease is determined.

A deficiency disease of swine characterized by certain bone and joint changes and by loss of motor function, has attracted much attention in recent years. A very popular term used to designate this disease is Posterior paralysis. Such other names as leg weakness, loin weakness, rheumatism, rickets, osteoporosis and osteomalacia have been used in various localities.

The etiology and symptomatology of this disease are very similar to those mentioned for the mineral deficiency disease of cattle. That a shortage of mineral matter has been the primary cause of this disease in swine has been clearly demonstrated. We have fed swine rations especially low in their mineral content with the result that within 60 days about 75% of the pigs showed evidence of the disease. Many field observations support this view.

The recognition of this disease clinically is not very difficult. Affected pigs show a sluggish attitude. Excessive rooting is frequently observed in the early stages, providing they have the opportunity. A short, stiltly or jerky gait is an early symptom. If they are forced to move at a fast walk or running gait, one will notice that every now and then they will “break” or “knuckle over.” Many affected pigs show a decided uneasiness when standing by lifting and moving their feet in order to shift their weight from one leg to another, and thereby reduce pain. Enlargements and deformities frequently occur in some of the joints of the limbs. With the progression of the disease the symptoms become more intense and often more complex. A recumbent position may be assumed. The hind limbs are often held to one side or straight back. Many will drag or pull themselves about by using their knees as the fulcrum. Later such pigs will barely move from their place, but when attempted, is accomplished with much pain and difficulty. Abnormal development of the bones of the head and forepart of the body is not uncommon.

The death rate from this disease is not high. This largely depends upon the amount of care the animal receives at the hands of the attendant. If food and water are not carried to them and placed so that they can get it, they will die. We have seen cases where the owner thought he was doing
the right thing by supplying feed but never realized the necessity of water.

Post mortem examination of the viscera will not reveal changes which are characteristic of this disease. Lesions in the tissues are usually secondary and are contingent upon certain environmental factors. An inspection of the bones and joints should be conducted. The tissues surrounding a joint are often thickened. An extensive villous-like proliferation of the synovial membrane is a frequent finding. The articular cartilages of some of the long bones show areas of erosion or wrinkling. If one will saw through a long bone longitudinally, the compact substance is noted to be thinner than normal. Toward the epiphysis a rather dense and hard cellular proliferation about the periosteum is not unusual. Such bones will be softer than normal and therefore will cut more readily.

In connection with our studies on this disease, various lots of pigs were fed rations containing calcium carbonate (lime that had been slaked, dried and pulverized). In nearly every instance, at the end of the experiment these pigs finished without showing clinical manifestations of the disease. Calcium was used at the rate of 2% of the ration, mixed with the feed and fed dry. This indicates the advisability of using calcium as a preventive for this disease.

Two pigs that had been kept on a low mineral diet until marked evidence of disease was manifest, were then fed a ration to which calcium carbonate and cod liver oil were added. In three weeks' time these pigs showed marked improvement and were considered marketable. Several field observations in which a large number of pigs in various stages of the disease were involved, made splendid recoveries following the use of slaked lime as a part of their diet.

A disease which seems to be intimately associated with iodine metabolism is frequently observed. It is a disease of the thyroid of the dam, but is particularly manifest in the offspring. Pigs born of affected sows are often hairless or only partially covered with hair. An enlarged thyroid or goiter is often seen in the newborn pigs. Litters are frequently farrowed in which some of the pigs are apparently normal, others may be very weak or hairless and still others are born dead. The weak and hairless pigs usually die within a few hours to a few days.

Sheep are also affected with this disease due to conditions similar to that outlined above. Calves and colts born of dams deficient in iodine are weak and have a low degree of vitality at birth. Many have extremely large thyroids when born. Hairlessness is not a usual occurrence. The disease, however, is not as common among cattle and horses as it is in swine or sheep.

There are no definite clinical aspects that will foretell the probability of the existing disease in the adult. Occasionally one may observe a female with an enlarged thyroid. This may indicate the possibility of attending sequela. Examinations of the thyroids can be conducted on horses, cattle and sheep, but it is extremely difficult to examine them in swine.

That iodine bears a close relation to this disease seems to be fairly well established. Some experimental trials by Hart and Steebock of Wisconsin and rather extensive field trials by Welch in Montana and Kalkus
in Washington, have shown that by supplying the pregnant dam with iodine, normal young were born. On the other hand, animals kept under the same conditions, except that no additional iodine was supplied, gave birth to hairless pigs, goitered lambs, etc.

The symptomatology and pathology are analogous to simple goiter in man. The geographical distribution of this disease in animals very generally concurs with simple goiter in humans. Upper Michigan, Wisconsin and Minnesota, the western parts of the Dakotas and the states lying to their west, are considered as the zone of greatest occurrence of goiter in the human family. Inversely the southern and seaboard states show the lowest incidence of goiter. Likewise, it has been the northern states from which the greatest number of reports have come of the existence of a thyroid and its sequela in animals.

Whether the food or the water or both are deficient in iodine is unanswerable at this time. McClendon believes that the soil is deficient and therefore the vegetation will lack this element. Extended chemical analysis will clear this point.

The administration of iodine as a preventive is the best known method to attack this problem. The minimum amount of iodine necessary to prevent this trouble has not been determined. A grain of potassium iodide per day during the period of gestation is even more than an optimum amount according to Welch. However, no ill effects in swine are reported by using this dosage. Nevertheless, it seems advisable to recommend that one grain of potassium or sodium iodide per day should be administered covering the period of gestation. Circumstances will arise where the existence of the disease is not discovered until after one or more of the sows have farrowed and where others in various stages of pregnancy are on hand. In such cases, the dose must be graded according to the length of time since conception, at the same time bearing in mind the possibility of producing iodism.

It is important to note that when our attention is called to the existence of this disease on a certain farm, it should be a warning, indicating the necessity for the administration of iodine. It is further advised to consider the locality as one in which more cases are liable to occur. This applies especially to the territory referred to above. Isolated cases may occur in any section of the country since sows are often purchased and shipped from one place to another, when in advanced stages of pregnancy. This is especially true if the animal was obtained from affected districts. A careful history directed toward this point will often disclose such circumstances.

President Butler: The next paper is Nutritional Diseases of Poultry, a paper written by Dr. J. R. Beach, head of the Veterinary Division of Cornell University, but the paper will be read by Dr. Traum, of Berkeley, California.

Dr. Traum.
NUTRITIONAL DISEASES OF POULTRY

By J. R. Beach, Agricultural Experiment Station, University of California.

The recognition of the existence of diseases of poultry due to nutritional factors dates from Eijkman’s observation in 1890 that polyneuritis or beri-beri in chickens resulted from a diet consisting entirely of rice. This disease, which has since been proved to be caused by a deficiency of Vitamin B, is of no economic importance in this country because poultry receive sufficient of the essential vitamin in the grain they consume. In later years incorrect diet has been suspected to cause several diseases of poultry but has been definitely proved with respect to only two, i.e., leg weakness of chicks and nutritional roup.

Leg Weakness of Chicks. This disease has long been a serious difficulty encountered by poultrymen when raising chicks in confinement. It usually develops within 4 to 6 weeks after hatching but may appear several weeks later. The principal symptoms are weak, unsteady gait and tendency to remain squatted; ruffled plumage; paleness of the comb and wattles; and often swelling of the joints of the legs. Post-mortem examination reveals no characteristic changes.

Poultrymen have considered leg weakness as due to over-feeding, lack of green food, insufficient exercise, or lack of mineral water. They have generally been successful in eradicating the trouble by correcting all these supposed wrong practices, but did not know which factor or factors effected the cure.

No careful study of the cause of leg weakness was made until investigators in nutrition experienced difficulty in the use of chicks as experimental animals in confinement. Osborne and Mendel in 1918, reported success in raising their experimental chicks from leg weakness by the addition of a plentiful amount of roughage in the form of paper pulp to the ration. Hart, Halpin and Steenbock in 1920, reported results of more extensive study of leg weakness in chicks.

Their conclusion was in confirmation of the observation of Osborn and Mendel that leg weakness is caused by feeding a concentrated ration with a lack of digestible roughage, and not to lack of green feeds, outdoor air, exercise or over-feeding directly. Ground paper incorporated with the ration was the most effective roughage used. It was necessary that the roughage be actually incorporated in the ration, not merely available in a coarse form as cut paper or litter.

The next work to throw further light on the etiology of leg weakness was that of J. S. Hughes. In these experiments different lots of chicks, which were fed the same standard ration of scratch feed and mash supplemented with sprouted oats and buttermilk, and kept in a room where the light was filtered through glass or in a dark room, developed leg weakness, while those fed the same ration and exposed to direct sunlight or ultraviolet rays each day or given cod-liver oil developed normally. The con-

clusion reached from these results is that leg weakness in chicks is identical with rickets in mammals.

We now have, therefore, two conclusions in regard to the etiology of leg weakness of chicks, i.e., a lack of suitable roughage in the ration and a deficiency of the antirachitic factor, the latter probably the most important.

Nutritional Roup. In 1919, Haring, Jaffa and the writer reported a study of several outbreaks of a disease occurring in flocks of pullets in California which, so far as could be determined by a search of the literature, had not been previously described. The manifestations of this disease resembled those of “roup” more than of any other known disease but differed sufficiently that a differential diagnosis was readily made.

Owners of flocks in which the disease occurred reported losses of about 10 per cent of their fowls within two to six weeks. Examination of several such flocks showed 10 to 20 per cent of the fowls to have typical lesions. All flocks observed consisted of fowls in their first laying year or of pullets that had not reached laying age.

The characteristic symptoms of this disease are confined to the head and involve the mouth, pharynx and esophagus, and the eyes.

A discharge from the nostrils of a watery or viscid fluid is nearly always present. Later this may collect in the infraorbital sinuses, become transformed into a caseous mass and cause swelling of the face. This involvement of nasal passages is indistinguishable from the commonly occurring “colds and roup” and in the absence of other symptoms is of no diagnostic value.

The lesions in the mouth, pharynx, esophagus and crop consist of collections of white caseous material in the mucous glands. On the surface of the mucous membrane they appear as circular white pustule-like caseous patches, 5 to 2 m.m. in diameter. These lesions commonly appear first in the pharynx and later on the tongue, floor of the mouth and in the esophagus.

The number of “pustules” may remain small or become so large as to almost cover the mucous membrane surface. On autopsy pustules are frequently found in the esophagus throughout its entire length. Unattached masses of white caseous material often collect in the mouth. Pustules, in very many cases, precede all other definite symptoms. They have been found in nearly all affected fowls examined and so far as is known, are associated with no other disease or condition.

The lesions in the eye consist of an ophthalmia producing puffiness of the eyelids, reddening of the conjunctiva, a profuse watery secretion which soon becomes viscid and may glue the eyelids together, followed by the formation of a tightly adherent white film over the membrane nictitans and the accumulation of a mass of white caseous material within the conjunctival sacs. The film over the membrana nictitans and the whiteness of the caseous material are the characteristics of these eye lesions which

4. California Experiment Station Report, 1919-'20, p. 79.
differentiate them from those due to other causes. Eye lesions have been observed in less than 50 per cent of diseased fowls examined, and, as a rule, have been preceded or accompanied by the characteristic “pustules” in the pharynx.

Marked emaciation and weakness occur in the later stages of the disease although many fowls die suddenly while still in good flesh. In many cases there is a deposit of a chalk-like substance on the feathers below the vent.

Besides the above lesions, the most prominent changes found on autopsy are in the kidneys. These organs are usually pale and marked by a network of fine white lines which are urate-filled tubules. In some cases the kidneys are spotted with collections of urates. Occasionally there is a deposit of urates on the surface of the heart, pericardium, liver and intestines. In some cases ureters are greatly distended with urates.

The bacteriological examination of diseased birds showed the caseous material in the mouth and eyes to be swarming with several types of rod-shaped bacteria which grew readily on ordinary culture media. Attempts to produce the disease, however, in healthy birds by inoculation with cultures or with the caseous material itself failed in all cases. Confining healthy with diseased fowls in small coops also gave negative results. No bacteria were found in smears nor growth obtained in cultures made from the heart blood, liver, spleen and kidneys.

Observations made in several outbreaks have led to the belief that the disease might be produced by a shortage of greens, an excess of protein, the use of cocoanut meal in the mash, a ration deficient in protein, or a combination of a shortage of greens and any of the other factors mentioned. A considerable degree of success in controlling the diseases was attained in all cases by making those changes in the ration which a study of the conditions seemed to indicate.

The success in controlling outbreaks so strengthened the theory that the disease is caused by nutritional factors that additional investigation seemed warranted. Accordingly, the writer conducted a controlled feeding experiment designed to furnish evidence concerning all suspected feeding errors.6

These experiments showed that the affected birds were uniformly distributed throughout the pens in which no greens were fed, irrespective of the rest of the ration, and the number affected was so small in the pens in which greens were fed as to be almost negligible, it appeared quite certain that a “lack of greens” was the sole cause of the occurrence of nutritional disease among the fowls used in this experiment.

These results suggested that the disease was caused by a deficiency of some vitamin in the ration and experiments just completed have shown this to be the case. In these experiments eleven pens of fifteen fowls each were fed a basal ration of mixed grains and meat scrap properly balanced for poultry but containing no yellow corn. No other food was given in pen I, the control. In pen II the basal ration was supplemented by a salts mixture consisting of calcium carbonate, calcium phosphate, sodium chloride, sodium sulphate and iron sulphate; in Pen III by buttermilk; in pen IV by
TWENTY-SEVENTH ANNUAL MEETING

cod liver oil; in pen V by dried yeast; in pen VI by orange juice; in pen VII by cod liver oil and dried yeast; in pen VIII by cod liver oil and orange juice; in pen IX by dried yeast and orange juice; in pen X by cod liver oil, dried yeast and orange juice, and in pen XI by lawn clippings.

With the exception of 4 birds, which died from other causes, all of the 75 birds in the 5 pens in which the basal ration was fed alone or supplemented by the salts mixture, yeast, orange juice or yeast and orange juice, developed characteristic pustules in the mouth and pharynx, ophthalmia or kidney lesions. Sixty-nine of these died and two were living at the termination of the experiment, although pustules were still present in both. These two fowls were found to be eating eggs, which very possibly supplied Vitamin A to prevent death.

In the one pen in which buttermilk was fed, nutritional disease affected 12 birds, only three of which died. Analyses of several samples of the buttermilk showed butterfat content of .1 to .5 per cent. This very probably supplied sufficient Vitamin A to modify the disease in this pen.

On the other hand, all of the 75 birds in the 5 pens in which the basal ration was supplemented by cod liver oil, cod liver oil and yeast, cod liver oil and orange juice, cod liver oil, yeast and orange juice, or lawn clippings remained entirely free from all the symptoms and lesions which characterize the nutritional disease.

These results should justify the conclusion that the disease is due to Vitamin A deficiency.

Vitamin A deficiency as the cause might also explain the apparent infrequent occurrence of this disease during winter months in middle western and eastern states where yellow corn in poultry rations is more extensively used than in California.

It would seem, therefore, that this disease, which the writer has previously designated as "a nutritional disease resembling roup," should now be designated "a nutritional disease caused by Vitamin A deficiency," although the name "nutritional roup" might be more suitable for use by poultrymen.

There is little likelihood of this disease ever occurring in any flock plentifully supplied with green food, no matter how deficient in sources of Vitamin A the ration may otherwise be. In time of a scarcity of green food the liberal use of yellow corn in the ration would in all probability at least partially compensate for the deficiency.

President Butler: The next paper on the program is the report of the Committee on Nutritional Diseases, by Dr. Schalk.

Dr. Schalk: Mr. President and Gentlemen: Your Committee on Nutritional Diseases hesitated considerably before starting on its work. As you learned this morning it is a newly created Committee of this organization, and not having any precedent as to the work they were to accomplish, and not having any specific instructions from the Association we did not know just where to begin or leave off.

The Nutritional field, including nutritional feeding and their implications in diseased conditions of a strictly nutritional nature and disturbances due to lack of food or to changes in food in which the food value
has deteriorated, changed or destroyed entirely. We knew we did not have time to cover that entire field and we concluded to have two specific papers as you have just heard on work that is pretty well recognized and accepted and the report is just a general consideration. As the hour is growing late I will try to read rapidly, and cut out some of the things not so essential.

REPORT OF COMMITTEE ON NUTRITIONAL DISEASES

A. F. Schalk.

Perhaps the greatest and most outstanding achievement in Medical Science during the last century was the discovery and recognition of the germ theory of disease. Its significance was of monumental importance to science and it opened an epoch in medicine, which will command unusual recognition through the ages.

Infection from micro-organismal agencies has so admirably and satisfactorily explained the Etiology of so many conditions in the domain of animal diseases during the last fifty years, that the present day endeavor of those entrusted with the hygiene and sanitation of our domesticated live stock is to give this method first and in many cases the only consideration.

While it is logical to give preference to the exhaustion of all the ordinary methods in the determination of whether an unknown disease is or is not of germ origin, it should not be done to the exclusion or the failure or neglect of a thorough and comprehensive investigation of other possible causes of disease. Although a very large number of our present day animal diseases are associated with infection, the list of non-infectious diseases remains unusually large.

Among others, perhaps the more probable causes of diseases which have failed to sufficiently attract the attention of investigators in the past are those involving nutrition, foods and feeding.

The term nutrition has undergone a revision during the last few years. In fact, the science of nutrition has been more or less revolutionized. Just as nutrition specialists, chemists, animal husbandmen and sanitarians were reasonably sure that carbohydrates, fats, proteins, water and the various salts told the entire story of nutrition, a few preliminary researches proved rather conclusively that the old theory was no longer tenable.

It has been shown that there is, in addition to these time-honored and established nutritional factors, something else essential, something vital to the welfare of the organism. Although this “Vital Something” was hinted at and suggested as early as 1881, when Dr. Lunin stated that “substances other than casein, sugar, fats, milk and salts were indispensable to life,” no real progress was made to develop his theory for more than thirty years.

However, in 1912, Cashmir Funk said, “There is a force which exercises vital guardianship over the nutritive processes by which most food materials are translated into human feeling, thought and action. That force I call Vitamin because it is the warden of health, because it is necessary to life.” This formal announcement made no specific reference to animals, but as food is more or less basic and the elemental food require-
ments are practically the same in the animal kingdom, it finds favorable application to our domesticated live stock as shown by recent and pending experiments.

Some objections have been raised as to the name Vitamin since the active principle is not an "Amine," chemically speaking, and such names as "growth substances," "food harmones," "accessory food substances" and "growth determinants" have been suggested. However, the term Vitamin bids fair to survive as "Vita" indicates the real significance of the substances involved.

In attempting to define Vitamins, all that can be said with certainty is that they are substances of unknown constituency, present invariably, though always relatively small quantities, in natural food materials, which are absolutely essential to normal metabolism. The absence or lack of the proper and sufficient quantities of vitamins leads to "Avitaminosis" or certain so-called deficiency diseases.

Considerable skepticism and conservatism has been and, to some extent, is yet manifested on the part of many in accepting this newer nutrition, but the classical and fundamental investigations of McCollum, Hart, Steenbock, Funk, Hess, Mendel and Osborne and Holst and Froelish and many other reliable workers have shown quite conclusively that the new order of nutrition is not a fad or fancy, but a reality. The science of nutrition has been materially enriched, which enrichment will surely be reflected in the future welfare of our domesticated live stock, as well as in the human race.

Originally it was thought that this life-sustaining and vital factor was confined to a single substance or element. Today we recognize four definitely established vitamins and one is in the process of verification. The family roster now consists of:

- Fat soluble A. Vitamin—with anti-rachitic properties.
- Water soluble B. Vitamin—with anti-neuritic properties.
- Water soluble C. Vitamin—with anti-scorbutic properties.
- Vitamin D., which has shown unusual qualities in stimulating the growth of yeasts and other micro-organisms, and Vitamin X, whose role in metabolism in animals has not been definitely established.

As the literature is somewhat confusing on the nomenclature involved, this discussion will refer, in a general way, to the entire field of nutritional possibilities under the headings of "deficiency" and "insufficiency" diseases. The term deficiency is applied to those diseases resulting from the lack of true vitamins and mineral elements and insufficiency to those conditions arising from actual lack of quantity and quality of the ordinary foodstuffs which supply the necessary energy, calories, etc. Under the latter term may also be included those pathologic states which evidently result from gross modifications and deteriorations in the real food constituents, from the presence of molds or other fungi, bacteria, yeasts and possibly other extraneous agencies.

When considering the strictly deficiency diseases, the average Hygienist of today is too prone to think of them as something that affects only the human race and possibly a few experimental animals. He is, perhaps,
familiar with such terms as beri-beri, pellagra, scurvy, Barlow's disease and other human ailments of recognized dietary deficiency, but does not associate them in any way with possible similar conditions in the animals of his practice.

Perhaps the foremost reason for overlooking or failing to recognize deficiency causes as contributary to many disease conditions is due to their nature and course. Usually there is nothing spectacular in their onset, as they do not possess the fulminating characters of most infections and contagions, but mostly pursue a slow though insidious course.

Then perhaps our conception of disease is in many cases too narrow for practical purposes. Not many fully acknowledge that there is a vital relationship of the proper food supply to the physiologic well being of animals, except in extreme cases of marked one-sided diet in which the defects are sufficiently grave to induce the development of a deficiency disease. We can, however, readily understand this when we consider that our standards of what constitutes health and wellness as opposed to illness or disease, as well as what goes to make up normal physical development, are relatively low and rather poorly defined. Animals are usually considered healthy until they look so unwell as to manifest symptoms sufficient to attract attention.

If we accept that normal growth, adequate maintenance, physiologic reproduction and possibly economic production are measures or standards of health, then we have no small amount of evidence, confirmatory to the effect that dietary deficiencies are responsible for many diseases.

For the most part the deficiency diseases are the result of trophic disturbances, either of a primary or secondary origin, and in the main present clinical characteristics of those encountered in the various malnutritions. Unfortunately, the exact substances of metabolism which are the etiological factors in these trophic diseases are not definitely known in all cases. Although the pathological anatomy underlying them is not fully known, and we are unable to present these factors in material chemical form and structure, we should maintain an attitude of open-mindedness regarding them. We know quite as much about the chemical nature of vitamins as we do of immune bodies, bacteriolysins and complements, and all these substances are no longer doubted as scientifically established entities.

Among the animals that have been utilized for experimental purposes to demonstrate deficiency in one form or another are mice, rats, guinea pigs, rabbits, cats, dogs, monkeys, various species of fowl, swine and cattle. In addition, in certain parts of the world where economic conditions are forcing dietary restrictions upon the human race, whole populations are functioning similar to experimental animals. If these data are carefully gathered and correctly interpreted, they will throw considerable light on the relationship of narrow, restricted, deficient diets to disease.

Since the most dependable sources of vitamins are to be found in our natural vegetable foodstuffs, apparently the strictly herbivorous animals, such as cattle, sheep and horses, would be less exposed to deficiency possibilities as compared to the mixed eaters, the omnivora and possibly the carnivora. If all other conditions were equal perhaps this would ob-
tain, but frequently other factors complicate the situation. Often these animals are subjected to long periods of dry feeding on markedly narrow and restricted rations, which may consist of a single foodstuff only, and which might be extremely low in the essential mineral ingredients. Evidently such circumstances create nutritional disturbances just as destructive as those caused by the lack of true vitamins. This point is well illustrated in the case of animals which are compelled to eke out an existence in a barn-lot with only a stack of wheat straw for food. The calcium content of wheat straw ranges from 2 to 3 lbs. per 1,000 lbs. of air-dried material, which is far below the minimum required for normal growth and reproduction. Further, as the mineral and true vitamin contents are both subject to rather wide variations in the different foods grown under different conditions of climate and soil, additional opportunities are afforded for nutritional failures in these classes of animals.

To one who has made only a casual reflection upon the subject, it may appear that deficiency disturbances in our farm animals are comparatively few and of little economic importance. However, upon a more careful survey one finds a rather extensive list of conditions, which are definitely allied with or more or less associated with some form of deficiency.

In fowls we recognize the so-called nutritional roup, the common leg weakness in young chicks and the pronounced malnutrition and emaciation in adult birds and the various forms and types of paralytic conditions prevalent in certain parts of the country. It is highly probable that the latter are forms of poly-neuritis, which can be readily induced by experimental feeding and in most respects closely resembles beri-beri in the human race.

Then there are the rachitic conditions. We are most familiar with them in the form of ordinary rickets, which are more or less common to the young of all domesticated animals, in the form of bowed legs, thick, knotty joints and knuckling attitudes. Besides these forms there seems to be sufficient evidence from recent findings to warrant the conclusion that rachitic deficiencies occur in the growing and adult animals, which manifests itself in skeletal inconsistencies, forms of malnutrition and especially failure to reproduce themselves physiologically.

Further to be considered are some of the non-specific types and forms of paralysis met with in farm practice. They most frequently occur in growing pigs, but are not at all uncommon in brood sows and mature cattle and possibly other animals. Supplying the necessary minerals with other nutritional requisites usually prevents many such maladies and invariably corrects them when treated in the earlier stages of their development.

Also, there is the goiter complex to be reckoned with. In some seasons, in certain regions, particularly our northern states, congenital goiter is not at all uncommon in the new-born of practically all of our farm stock. This form of deficiency finds its highest state of perfection, perhaps, in the failure of the development of a natural hair coat at birth, as well as other immature and undeveloped anatomical structures, such as are seen in hairless pigs, lambs and kids and goiterous malformed calves. While the administration of a small amount of Iodine in some form to the mother
invariably prevents such inconsistencies, the writer has long since been of the opinion that the proper adjustment of the rations to adequately supply the ordinary mineral ingredients in addition to the other proper hygienic conditions would also go far to offset these troubles.

Of especial significance is to be mentioned the great possibilities in connection with deficiency and the reproduction cycle. The preliminary researches that have been conducted along this line are truly of a fundamental character. They have brought to light facts of far-reaching importance in the hygiene of breeding animals. They have shown that breeding animals that have been maintained for long periods on one-sided, narrow, restricted rations, grossly deficient in mineral constituents and lacking in sufficient and proper vitamins are extremely liable to produce disastrous results in their breeding efficiency and may terminate in complete loss of reproduction.

Under carefully controlled experiments where nutrition was confined to grain and grain products, with pure water and common salt the oestrous cycle became infrequent, irregular and in many instances entirely suppressed. There were premature births with immature and undeveloped offspring, and greatly increased numbers of dead pigs and calves. These conditions proved to be accumulative and were transferred to second and third generations. The question immediately arises as to what percentage or how much of our irregular breeding, premature births, abortion and retained placentae, that are not definitely connected with abortion disease will find their solution in some form of nutritional deficiency?

There is also another group of diseases that may well bear investigation from the nutritional viewpoint. We refer to the various hemorrhagic diseases in cattle occurring in different parts of the country. They may not be and probably are not the direct result of lack of vitamins or proper mineral balance in their foods, but, nevertheless, disturbed nutrition in some form may play more than a minor role in their production.

In connection herewith may be discussed the possible effects of molds, fungi, yeasts and non-pathogenic bacteria and other foreign agencies upon the various foodstuffs. Acknowledging that their presence and metabolic products may not be directly injurious or toxic for animals, we must not overlook the possible effect of their direct action upon foods. Among the detrimental products that may develop in foods from them may be named the various decomposition products, ptomaines, tox albumens, split protein products, as well as certain alkaloids and glucocides. Any or all of these may so alter, deteriorate or destroy the real food elements to such an extent that serious nutritional disturbances may result.

As a specific instance of such types of diseases we call your attention to the hemorrhagic disease in cattle found in parts of Canada and some of our north central states. In North Dakota alone more than one hundred farms have reported losses of this nature during the last year. A questionnaire circulated among the owners revealed the fact that upon every farm where losses were sustained, moldy or spoiled sweet clover hay or silage formed a part of the entire rations used. As early studies proved the non-toxity of the fungi isolated from the spoiled specimens of hay,
when fed in pure culture in abundance it would appear that the presence of mere mold does not explain the trouble.

In the promotion of health and the maintenance of nutritional equilibrium in animals, there is absolutely necessary in addition to the required vitamins and minerals, a sufficient quantity of the old-established food entities—carbohydrates, fats, proteins and pure water. These are not always provided and in many cases where the owner has perfectly good intentions of doing so. It so happens in certain seasons from protracted droughts, insect pestilence and other destructive agents that whole communities fail to produce either forage or grain crops in sufficient quantity to adequately nourish their live stock. Another important source of food insufficiency on the part of the owner is his failure to know and recognize foods of quality and dependability.

How often do we encounter conditions where the diet of live stock is confined to grain straw, marsh grasses, over-ripened, woody, leafless hays, light oats that are mostly hulls and low grade screenings. The owner, thinking they are real foods, feeds them in good faith with the result that his animals will soon present a symptom complex stimulating unthriftiness, malnutrition, stunted growth or failure in economic production in herd or flock. The nutrition may be so limited and low as to lead actual starvation unbeknown to the owner.

Particularly beneficial and important appears to be a careful investigation of the inter-relationship of nutrition and infection. We now recognize that such nutritional factors as absence or lack of sufficient quantities of proper vitamins, minerals and recognized food elements in animal rations result in delayed and stunted growth, malnutrition, failure in reproduction, prevention of completing their life cycle in a normal way and in some instances terminates in death. This being true, is it not probable that such deteriorating and devitalizing processes may be potent factors in bringing about what we term lowered vitality, lowered resistance and increased susceptibility to infection? It is of more than passing interest to sanitarians to know just what influence these conditions exert in the way of predisposing causes to some of our infectious diseases such as tuberculosis and abortion disease. It would appear from the literature that this particular phase of the problem has not been subjected to special study and which may prove a very worthy and fruitful field.

In conclusion we may ask what all this means to the veterinary practitioner. Realizing that the changed condition in Animal Industry is causing a corresponding change in Veterinary Medicine, the practitioner of the future will be called upon for a much more comprehensive and varied field of service. In this new and enlarged capacity he must above all become a competent Hygienist, a Sanitarian. As such, he must thoroughly familiarize himself, not only with the new food factors, the newer nutrition, but with all phases of this important subject in the realm of nutrition, feeds and feeding, which may have a bearing upon animal health and disease.

He should further acquaint himself with the geologic formations of his territory, know the waters, both resident and stream, learn the nature of the soils, and whether forage and grain crops produced therefrom pos-
sess plenty or are deficient in the necessary mineral elements, such as lime and phosphorus. Having such knowledge in hand, he will be well equipped when called for consultation to diagnose with a high degree of accuracy and to advise and prescribe intelligently. If he finds a state of deficiency or insufficiency present in the animals, he will not be compelled to recommend commercial mineral mixtures and "Vita" compounds of unknown composition and usually of the expensive shotgun prescription varieties, but he will have the knowledge and courage to approach his problem in a logical and scientific manner. He will institute dietary measures in the way of proper and sufficient foodstuffs and if necessary prescribe locally the extra lime, phosphorus, etc., if needed. In so doing he will have given the owner efficient and economic service, increased his local prestige, and, above all, become more worthy of the community clientage.

President Butler: I am sure it was worth while to hear that report from the Committee on Nutrition. Dr. Schalk has pointed out some very, very interesting factors in that line. The two papers and the report are open for your discussion.

Dr. Cullen: Mr. Chairman, the nutritional diseases of the north have been discussed, and the nutritional diseases of the far west. There is another disease that is now thought to be due to deficient nutrition in the south, called the loin disease, and I understand from a letter from Dr. Francis of Texas that one of his associates, Dr. Schmidt, has been working on that disease, and that recently Sir Arnold Tyler visited their station to look into this same matter, and as Dr. Schmidt is here I believe it would be very appropriate to have some word from him in connection with these conditions described in other parts of the country.

President Butler: Dr. Schmidt.

Dr. Schmidt: We have had a disease of cattle in south Texas on those low poorly drained plains close to the Gulf of Mexico that has been bothering us for some time, or rather has been bothering the cattle of that district. We have been looking into that matter, and we are attacking it with the idea of the possibility of it being a contagious disease.

We have diligently looked for microbic organisms in all the organs, we have tried to reproduce the disease artificially but up to recently we have failed entirely. We have tried the transfusion of blood, tried to make extracts from the organs and inject it into the healthy animals, we have tried to take the intestinal contents and infect the animals and in every case we have failed.

On the other hand the symptoms of the disease has suggested a contagious disease and we are at a loss to know just how to explain it. These symptoms of the disease are something like this: The animals as a rule are strong, healthy and fat, they have been feeding on grass that is almost knee high, the disease occurring in the spring of the year when we would think that the nutritional qualities of the grass were at their best. The animals would go down very suddenly.

You would notice first probably that the animal was not following the herd, probably it would frequently lie down and rest and within a very short time, probably within less than twenty-four hours you would
see that animal was unable to get up, and within a short time after that, usually within two or three days, unless properly cared for, you would find the animal dead.

When such animals are brought in and placed in the shade, watered and fed, and frequently turned over, they may live a long time, sometimes two or three weeks, but the great majority would die.

We have been trying to explain this condition on the contagious disease theory and made no headway. We had botanists look over the range and tell us what kind of grass was present there, but they could find no plants that would suggest themselves as causes. We then thought it might be due to botulism and we got some serum from some of the commercial houses and injected it into some of the animals, but the results were negative, thus eliminating that possibility.

Then last spring we found some bones that we had collected from animals that died with the loin disease the previous summer, two animals were fed with the bone ground up one of which developed a typical case, both clinically and pathologically, of loin disease.

This animal had received a total of about thirty pounds of ground bone; the bones came from one animal that died in August, 1921, and from one animal that had died about July, 1922.

The interesting thing it seems to me, is that we are about to solve the problem, and probably identify it with the so-called lamb disease of South Africa. We are just about ready to make that statement.

In this connection I wish to state that Sir Arnold Tyler said definitely that he was not fully able to stop the danger in South Africa by feeding the animals rock phosphate. I think Dr. Cotton mentioned a while ago by giving the animals rock phosphate that the nutritional disturbances he has observed can be prevented. Sir Arnold says it cannot, but you can easily prevent it by feeding ground bone, it has to be sterilized ground bone. It seems that this disease is also due to a lack of phosphate.

That is a nutritional disease but at the same time a secondary factor involved seems to be a toxic producing organism that the animals pick up from others infected.

I may add that all the animals in that district are bad bone eaters. When an animal dies, if left on prairie, you will not find a single bone left at the end of three or four weeks, they will have been eaten up by the cattle.

President Butler: We have a similar condition among cattle in Montana. We find it in the foothill country. We never find it where there are alkaloids, it is always in the hill country where we have considerable snow. It is always considered as being due to a deficiency of lime or phosphate or both.

Dr. Kernkamp: Mr. President, in reply to Dr. Schmidt's statement that I said Sir Arnold Tyler said calcium phosphate prevented the loin disease, I did not say that. I said Eccles of Minnesota had made the observation in Minnesota when the cattle had been fed rock phosphate in the bone, not Sir Arnold Tyler. I said the disease in Minnesota sort of resembled the disease Dr. Tyler speaks of.
Dr. Schmidt: That is what I had in mind, that Tyler said it could not be prevented by feeding rock phosphate, but Eccles of Minnesota had succeeded in preventing this disease, which is essentially what Dr. Kernkamp said.

Dr. Kernkamp: At one stage of the disease.

Dr. Leinhardt: Mr. Chairman, I would like to call the attention of the Association to an experiment that is under way at Kansas City on hogs on nutritional factors, which deals with vitamins. It primarily started from mineral metabolism in hogs, but because of differences in mineral metabolism we conceived the idea there might be a deficiency in vitamins. So we projected experiments first on small animals and then on hogs.

We fed the hogs a crushed ration consisting of 87 per cent white corn, ten per cent tankage and three per cent bone acid. That ration was fed to one group.

Another group received the basal ration plus alfalfa, first five per cent, then ten, because we found five per cent was inadequate.

Another group received the basal ration plus five per cent butter fat, and another group received the basal ration plus one quarter pound of sprouted oats per day per head.

These hogs have been fed continuously by the animal husbandry department, the compounding of the ration being taken care of by the Chemistry Department, and the observation collected by the Pathological Department.

At the expiration of about four months one of the animals came down with the typical symptoms of posterior paralysis, which was associated with mineral deficiency.

The first thing seems to be a tendency on the part of the animal to get its hind feet well up under the body, lower the head and carry it a little tilted to one side. That condition continues until the pig usually has a well defined arch in the back. After that he goes into convulsions and goes through all kinds of queer antics. He may keep that up for ten or fifteen minutes or longer and then it will disappear. Usually the appetite is lost before that time and blindness occurs.

These animals were kept in pens on concrete floors and all of the pens had an alley way that led out to the outside, so they could also be in sunshine. There was no restrictions, of course, placed on them being outside or inside, they could go out when they wanted to and could come in when they pleased. Of course they were separate in the pens, so that an account of the feed that was consumed was generally equal. The animals in the basal ration lot came down the same way with one exception and that animal developed rickets, later on in the experiment.

The animals in the basal ration lot were experimented upon to see whether or not we could not build them back with the addition of cod liver oil, so we gave the pigs an ounce of cod liver oil per head per day, those that were affected. One animal was not infected and in his feed no cod liver oil was placed. That pig failed to come down, it still continued to do fairly well, but did not gain like the others.
The others came back in good shape, regained their feed and put on their flesh and made good gains. This one did not make very good gains. We finally considered that perhaps some of the cod liver oil was not emulsified properly in the intestines and came through unchanged and this pig had access to the droppings and picked them up and was getting sufficient cod liver oil to carry him over and keep him from coming down. So we then penned him in one of the other pens, and he had no access to sunlight or outside air at all, and that one developed ricketts. The other pigs showed no signs of ricketts, the bones were good and hard and showed no abnormal development or deformity.

These animals recovered, as I say, from the addition of cod liver oil.

The ration that was fed was a ration that is commonly fed farm animals, swine especially, and of course white corn contains no vitamine A, tankage contains no vitamine A and bone acid contains no vitamine A.

In addition to that I might say that the ration is deficient likewise in vitamines C and D. The C, of course, was supplied in the one lot by the sprouted oats. We had no adequate source of supply for D. However, we had no evidences of ricketts except in the one animal that was penned up and failed to get out into the sunlight.

The sprouted oats did not furnish a sufficient quantity of vitamine A to hold the animals and two of the animals in the sprouted oats lot came down just as those in the basal ration lot did, only it took a longer time.

The animals that received the alfalfa were in the best condition, made the best gains and apparently received sufficient vitamine A. The animals receiving the butter fat made fair gains, very nearly as good as the alfalfa lot, but they developed sore feet and they started to develop the arch in the back. These animals are still under observation this year, the purpose, of course, being to determine the effect of the feeding on the offspring.

We were unfortunate in so far as this year is the first year we have ever been able to observe any of the animals in the basal ration lot. One animal had come down that we gave cod liver oil to, she came in at irregular time, and after receiving cod liver oil a week or so, as she again came in heat. She was bred and she farrowed. The other animals did not come in heat and we have not been able to breed them.

The rest of the groups have all been bred and we are awaiting the results of the farrowing.

You may be interesting in knowing that we made some experiments and find the chief deficiency is in vitamine A. This condition yields quite promptly to treatment. You must separate the sick animals from the well. Sick animals should be fed one ounce of cod liver oil per day for about three days, the ration should be changed and an adequate amount of Vitamine A supplied through feeding yellow corn or alfalfa hay, putting them on some green stuff first if possible, a little sprouted oats or something like that for the time being, and they usually respond quite well.

We find also that there is a degeneration of the nerves of the hind legs and of the forelegs and degenerative changes appear in the animal and the animals that get down and stay down for a time will not respond
to treatment. That is, you can arrest the condition and stop the progress of the degeneration, but because of the low regenerative power of nervous tissue you cannot cause that nerve to conduct reflexes that will successfully cause that pig to use his legs or move as he should.

President Butler: Any further discussion of these papers and the report? If not, a motion to adjourn until nine o'clock tomorrow morning will be in order.

An adjournment to Thursday, December 6, 1923, at 9:00 o'clock A. M.

TWENTY-SEVENTH MEETING OF THE UNITED STATES LIVE STOCK SANITARY ASSOCIATION.

Thursday, Dec. 6, 1923, 9:00 a. m.

President Butler: The meeting will now come to order. The entire morning session will be devoted to the subject of Tick Eradication. The first paper of the program is the “Application of Zone Plan in Systematic Tick Eradication,” but unfortunately Dr. Wm. Moore, State Veterinarian, Raleigh, N. C., who was to deliver this paper, has been unable to attend this meeting. We will therefore take up the next subject, “Is It Advisable to Undertake Tick Eradication Without Available Funds?” by Dr. J. H. Bux, State Veterinarian, Little Rock, Ark. Dr. Bux has had considerable experience in tick eradication work, and we will all learn from what he has to say. We in the north may think that tick eradication does not mean very much to us, but in such a thought we are sadly mistaken. If it had not been for tick eradication work it is doubtful if this Association had been founded. Certain it is that it is this work that started this Association. If we in the North systematized our work in the eradication of some of our live stock diseases after the manner tick eradication work has been systematized in the South, it is very probable that we would make better headway in eradicating some of our own live stock troubles, such as hog cholera, cattle scab and several others. Dr. Bux’s paper will be discussed by Dr. R. E. Jackson, Birmingham, Ala., and Dr. E. P. Flower, State Veterinarian, Baton Rouge, La., will sum up Dr. Bux’s paper and Dr. Jackson’s discussion.

President Butler: The next paper is the “Review of Year’s Work in Tick Eradication” by Dr. R. A. Ramsey, Washington, D. C. There is no one in a better position or better able to give a review on tick eradication than Dr. Ramsey. Unfortunately he is unable to be with us this morning, but his paper will be read by his assistant, Dr. Mackeller.
A REVIEW OF THE YEAR'S WORK

IN

TICK ERADICATION

1923

W. M. MACKELLAR,
Assistant Chief, Tick Eradication Division,
Bureau of Animal Industry.
UNITED STATES DEPARTMENT OF AGRICULTURE

Bureau of Animal Industry
Washington, D. C.

STATEMENT OF RESULTS—TICK ERADICATION—July 1, 1906, to December 31, 1923.

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</tbody>
</table>
A REVIEW OF THE YEAR'S WORK IN TICK ERADICATION
1923

W. M. MACKELLAR,
Assistant Chief, Tick Eradication Division, Bureau of Animal Industry

The year now nearing its close has been one of the most active in tick eradication since the inauguration 17 years ago of the nation-wide campaign to drive this pest from its stronghold in the South. Up to November 1, during the 1923 season, this work was prosecuted in 416 counties by the co-operating forces in 10 southern states. In 112 of these counties systematic tick eradication was under way and in 304 counties clean-up or final work was done.

The services of 2,075 inspectors were used on the county, state and federal forces, to inspect and supervise 48,801,643 dippings of cattle in more than 31,000 dipping vats, in which in excess of 750 tons of arsenic was used in the preparation of the arsenical bath. Preliminary tick eradication work by means of motion pictures, shown by the Bureau's motion picture traveling outfits, was continued throughout the year, 35,282 people attending the exhibitions of these educational films at 267 shows, given in five states.

With few exceptions the interest taken in this work and the cooperation given by cattle owners and officials was good. However, in a few sections, notably Echols County, Georgia, and Amite County, Mississippi, the opposition became so defiant and the destruction of public property in the shape of dipping vats was so great, that no alternative was left but to meet this lawless element with force. Accordingly, to secure enforcement of State laws and regulations, an additional number of State and Federal inspectors, provided with suitable means of defense, were assigned to duty in these counties. It is deeply regretted that in spite of all the precautions taken to safeguard the inspectors, one Bureau employee was killed and another seriously wounded in Echols County, Georgia.

The annual revision of the Department of Agriculture Rule, to prevent the spread of splenetic fever in cattle, is now being prepared and will probably be issued as effective on and after December 31, 1923. The rule which describes the quarantined area in the respective States will indicate several changes in the territory held under Federal quarantine. This order will show the release from quarantine of one whole county and 3 parts of counties in the State of Arkansas; 5 whole counties in the State of Georgia, and 5 whole counties and 2 parts of counties in the State of North Carolina. It will also show the requarantine of 2 whole counties in the State of Alabama; 1 whole parish in the State of Louisiana, and 8 whole counties and one part of a county in the State of Texas.

It will be observed from the foregoing tabulation that while more than two-thirds of the counties that were quarantined have been released, only about one-half the counties included in the original quarantine in 1906.
can now be considered absolutely tick-free. The elimination of the last trace of infestation in a county is frequently attended with considerable difficulty, and past experience in these areas indicates the need for a closer scrutiny of local conditions before the release is made and the closest possible supervision of the final work following release.

There have been no radical changes suggested or made in the methods used in conducting this work during the year. The paint mark check as a means of insuring the regular dipping of all cattle has been used to a greater extent than in the past and is now recognized as a necessary procedure and is required by the regulations of most States. The need for more intensive work and the concentration of efforts on such areas as the means at hand will permit of thorough work, is becoming more and more apparent as the work proceeds southward.

State Live Stock Sanitary officials, with the possible exception of one or two States, have adopted and are putting into effect what is known as the "zone plan." This plan consists in the State officials designating by law, regulations or agreement, certain counties or areas contiguous to released area in which active and systematic dipping of cattle will be required beginning at a designated date. It is found that in this way efforts can be concentrated and tangible results obtained in minimum time. Two States, Florida and North Carolina, have enacting statewide tick eradication laws during the year. The zone plan of conducting the work is required in each of these laws.

President Butler: I am in receipt of a telegram from Dr. Bahnsen, State Veterinarian, Atlanta, Georgia, stating that unavoidable and unexpected duties prevent him from attending this meeting. We are indeed sorry that Dr. Bahnsen is not with us, but Dr. C. A. Cary is with us, and I will indulge his good nature and call upon him to talk to us upon tick eradication.

President Butler: The hour of 2:00 p.m. having arrived, the meeting will now please come to order. The afternoon session will be devoted to Abortion Disease. Discussion of the individual papers will be reserved until all papers on this subject have been read, and the report of the Committee on Abortion Disease delivered. The first paper is "Breeding Efficiency of Pure Bred Dairy and Beef Cattle" by Dr. W. L. Boyd, University of Minnesota, St. Paul. Dr. Boyd needs no introduction to you. His work along these lines has been brought to our attention a number of times. His viewpoints are always based upon close observation, and after considerable study and investigation.

BREEDING EFFICIENCY IN PUREBRED DAIRY AND BEEF CATTLE

W. L. BOYD

University Farm, St. Paul, Minn.

(Published with the approval of the Director as paper No. 452 of the Journal Series of the Minnesota Agricultural Experiment Station.)

The purebred cattle breeding industry occupies a very important position in relation to Agriculture and represents the investment in cattle alone, to say nothing of the capital invested in land, buildings and equipment, of an enormous sum of money. There are many very serious problems con-
fronting the breeder of purebred cattle, among which is selection in relation to type, conformation and production and early maturity, also the perpetuation of breeds, character and families, and last but far from being least in importance, is the problem of breeding efficiency. When cattle fail to breed regularly or only occasionally, the breeder is rewarded with small returns and the expenditure of time, effort and money is high. Hence, any factor, regardless of its source or nature, which interferes with the breeding efficiency of a herd, is a serious menace to the cattle breeding industry. To be successful in the breeding of purebred cattle requires the mating only of healthy animals, in order to preserve fertility and in order that the newborn calf will be strong, active, vigorous and ready to respond to growth stimuli.

The valuable purebred animal's worth is determined mainly by her ability to produce calves of equal value. When the organs of reproduction fail to function properly, her breeding can no longer be depended upon as a source of revenue, and the owner is forced to send her to the shambles for beef prices.

The Relation of Diet to Reproduction

The effect of diet on reproduction is a very interesting subject and considerable scientific evidence has been obtained from experiments conducted upon small animals.

Evans has shown in his studies of reproduction in rats that by feeding a certain restricted diet, that infertility will result, and that by the addition of other natural foodstuffs, their reproductive power will be restored. These findings apply to the male as well as the female.

Forbes in his investigations with the mineral metabolism of the milch cow, has demonstrated that high producing cows during their lactation period, are as a rule giving off in their milk more calcium and phosphorus than they are ingesting in their food.

The work of Hart, McCollum, Steenbock and Humphrey has definitely proven that a diet restricted to the oat and wheat plant, even if properly balanced, is not adequate for the nutrition of breeding cows, and brings about the expulsion from the uterus of a premature calf, which is frequently dead or, if alive, is weak and unthrifty. The results of experiments conducted with small animals may not necessarily apply to the large animals, but they are very interesting as well as suggestive, and may later prove to be a solution of many of the problems met with in the various disorders of the reproductive organs of breeding cattle. Numerous cows of the various dairy breeds, which have been highly fed on a diet rich in protein necessary for the establishment of phenomenal records in milk and butter production, have at times suffered with serious disorders of the reproductive organs, resulting in temporary infertility, in certain cases, and in other animals permanent or incurable sterility, while other cows equally as highly fed, and with records of equal brilliance and importance, have not experienced these difficulties, and have continued to breed regularly. The official testing of cows for the establishment of big records in milk and butterfat production, has no doubt been of great benefit to the various breeders and breed organizations; on the other hand, as official testing is practiced by many of our breeders, it is no doubt responsible for
decreased breeding efficiency. In the practice of feeding for high records, concentrates comprise the main part of the diet with small amounts of roughage. It is a known fact that concentrates are rich in protein and that they will stimulate milk production, and in as much as there is a close relationship between the mammary gland and the reproductive organs, it would seem to be more than a mere possibility that some of the disorders of the ovaries and possibly the uterus may be accounted for in this way. It is the writer's opinion that there is among the breeders of dairy cattle a growing impression that certain requirements for official testing, are detrimental to reproduction. It may be that the fault is not with the requirements of the different breed associations, but instead is with the individual who is responsible for the feeding of the animals. It may be that sometime, though probably not in the near future, some of the requirements may become less rigid or so altered that there will be a decrease in the number of cows becoming non-breeders following the termination of their test. The breeders of beef cattle do not have these same conditions to contend with, but they do have an important dietary problem to deal with in connection with the preparation of their animals for sale and show purposes, numerous females so prepared are known to be frequently affected with retarded conception or complete loss of fertility. A physical examination of many of these cases frequently fails to reveal pathologic or congenital defects, which will explain their inability to conceive.

Livestock breeders in general throughout the United States are interested in the subject of mineral feeding, and many of them are at the present time feeding minerals of different kinds and sources in the attempt to make the breeding of live stock a more lucrative business. The lack of vitamins and certain minerals in the various feeds may bear a very close relationship to certain forms of sterility, but more extensive and exhaustive research will be necessary before these important and now everyday questions can be satisfactorily answered. The percentage of sterility in cattle as a result of errors in diet, lack of exercise, congenital defects, together with specific infectious diseases, such as tuberculosis and actinomycosis, cannot be correctly estimated. However, they must be taken into consideration as important factors in the successful breeding of cattle.

In a recent article on Tuberculosis, Professor Bernard Bang of Denmark states that tuberculosis of the uterus probably occurs twice as frequently as it does in the udder. This statement would not in all probabilities apply to the cattle of America and, judging from our experience in the northwest, infertility or failure to breed as a result of uterine tuberculosis is indeed a rare occurrence.

Bovine Infectious Abortion—the Most Important Problem in Relation to Breeding Efficiency

The large percentage of the diseases of the reproductive apparatus which prevent or retard conception in breeding animals, are in the main due to the invasion of the various organs by certain micro-organisms. Of these, Bacterium abortus Bang is by far the most important. This bacterium is a frequent invader of the gravid uterus, as well as the foetus and portions of the foetal envelopes, and, according to the work of Theobald Smith has a predilection for the chorionic epithelium. Placentitis, fre-
quently associated with infiltration and oedema of the chorion, constitutes one of the common symptoms of uterine infection. That this infection is caused largely by the invasion of Bacterium abortus is evident from the fact that retention of the foetal membranes is a common symptom in herds, where abortion disease is known to exist, and in which the causative factor has been determined clinically, bacteriologically and by the application of the well known serological tests. Bovine infectious abortion, which is caused by the Bang organism, is a widespread infection in cattle and is a serious menace to the cattle breeding industry. Not only does the breeder suffer great financial losses from the loss of calves born either dead or prematurely, but from decreased breeding efficiency, resulting from the effect of temporary or permanent sterility in many of the infected animals.

Bacterium abortus is probably not directly responsible for many of the pathologic changes occurring in sterility, yet it frequently paves the way or makes possible the entrance of other organisms, which under certain conditions find a suitable field for growth and multiplication, resulting in either temporary or permanent loss of fertility. Pyogenic bacteria, namely streptococci, staphylococci, bacillus pyogenes and members of the colon group are the ones most often encountered. Uterine infections which are not caused by Bacterium abortus and are characterized by the act of abortion, as well as retention of the foetal membranes with subsequent sterility in a large number of animals, are known to occur. The results of the serological tests show, however, that a very large percentage of the abortions occurring in different sections of our country are the result of the activities of Bacterium abortus. The successful control or eradication of the disease produced by this organism would be of untold value to the breeders of purebred cattle.

Retention of the Foetal Membranes as a Factor in Sterility

Retention of the foetal membranes is recognized as the most common symptom of infection of the uterus. This pathologic condition is a very serious one, frequently producing extensive and alarming disorders of the various reproductive organs, terminating not infrequently in temporary infertility and occasionally in permanent failure to again successfully reproduce. This condition is also characterized by bringing about a decrease in milk production. It is a well known fact among dairymen that cows which suffer with retention of the foetal membranes do not as a rule milk as well, especially in the first stages of lactation, as do the cows which promptly expel their foetal envelopes. Retention of the afterbirth retards the act of involution and thereby permits of the absorption of the invading bacteria or their products. Cows affected with retained foetal membranes should be isolated and the removal of these membranes should be attempted only by the veterinarian.

The treatment for retention of the placenta requires great care and skill, and the veterinarian often finds his ability taxed to the utmost in the endeavor to not only preserve the reproductive power of his patient, but in many instances to prevent the death of the animal. Retention of the foetal membranes is a forerunner of sterility, and many cows in which conception is retarded or stopped have a history of having failed to expel the foetal membranes at their last calving period. Breeders of cattle,
especially those who are engaged in the breeding of pedigreed cattle, must recognize that retention of the placenta constitutes a serious menace to the breeding efficiency of their herds, and that the services of the veterinarian for the handling of same should be secured wherever possible.

The Relation of the Corpus Luteum to Breeding Efficiency.

The corpus luteum is a ductless gland of internal secretion, and originates in the ovary following the discharge of the ovum. This gland, when functioning normally, is of little or no interest to the practical breeder of cattle, but when it ceases to be physiologic and becomes pathologic, it is then an important factor in breeding efficiency.

The breeder of live stock considers as the chief symptom of early pregnancy, the cessation of estrum. While this is constant and reliable in the very large percentage of cases, it does not always prove fertilization has taken place. The corpus luteum of estrum is renewed every twenty-one days, but under certain inexplicable conditions, it will occasionally fail to be absorbed, and remains in the ovary for an indefinite period of time, causing cessation of estrum by mechanical blocking and through some form of internal secretion. Cases of this kind exist in every herd, and unless there are regular examinations made of the reproductive organs, will be looked upon as being in calf, passing by several weeks or months without showing signs of estrum, when suddenly estrum will reappear, thereby producing disappointment and discouragement to the owner, who suffers financial loss on account of retarded fertility. The corpus luteum of pregnancy remains throughout the gestation period and usually does not disappear until thirty or forty days following calving, at which time the estrous cycle is re-established. The corpus luteum of pregnancy is responsible for maintaining the raised nutrition of the uterus during the manufacturing process of the foetus, and it also is thought to have something to do in the development of the mammary gland and in the continued existence of the foetus in the uterus, during the early period of pregnancy.

If the corpus luteum, after the termination of gestation fails to degenerate, it continues to function and inhibits estrum, with the result that there is a delay in breeding, which act may be of short or long duration. This kind of a structure is known as a persistent corpus luteum, and it remains in the ovary for indefinite periods of time. All cows affected with persistent corpora lutea are not affected with absence of estrum, and not all cows in which estrum is absent, though they be not pregnant, are affected with a persistent corpus luteum. The removal of the corpus luteum is as a rule, provided that all of the other organs are free of pathologic changes, followed by the well known signs of estrum within three to five days, and if bred at this time will very frequently conceive. The corpus luteum is an important factor in connection with the breeding efficiency of cattle and the veterinarian can by the proper manipulation of this gland, establish estrum with marked regularity. The corpus luteum also bears a close relationship to some of the various disorders of the reproductive organs.

Cystic changes are among the most frequently encountered disorders of the ovaries. This condition may originate from the corpus luteum,
which gland very often undergoes cystic changes. In the majority of the cases of pyometra, there is present a retained corpus luteum, which may be projecting above the surface of the ovary or may be deeply imbedded. The removal of this gland will in the large percentage of cases be followed by marked improvement. The corpus luteum also affords in the hands of the veterinarian a powerful weapon for the production of mechanical abortion, indicated in those animals that have been bred too young, or which have been accidentally bred to sires of different breed or to scrub sires. There are certain pitfalls in connection with the removal of the corpus luteum and great care should not only be exercised in its removal, but also in determining whether it should or should not be removed. Proper handling of the corpus luteum is a valuable asset to the veterinarian for increasing the breeding efficiency of cattle.

In another large herd, fourteen cows, none of which were in calf, but in which there was an absence of estrum, were each found to have persistent corpora lutea. The corpora lutea were removed, and all but one of the animals exhibited the well known signs of estrum within seven days. The one which failed to come in heat was suffering with metritis and possibly infection of the ovary, which when disturbed, as is the case in the removal of the yellow body, became more severe. Some cows in which the corpus luteum is removed in order to restore estrum, do not always show the well marked symptoms of heat and consequently are not bred, but subsequent examinations will in almost every case reveal the presence of a newly formed corpus luteum, showing that ovulation had occurred.

The Relation of the Sire to Breeding Efficiency

It is frequently stated by constructive breeders that the sire is more than fifty percent of the herd, and while many of the best known breeders owe their fame and success to a great sire, it should not be forgotten that numerous other equally well known breeders owe their success to possibly one or two great producing females. Impaired breeding efficiency on the part of the sire is a definite and occasionally a serious cause of lessened or reduced fertility. Sterility in the male animal occurs less frequently than in the female, but its importance should not be overlooked. Numerous sires affected with impaired function of the reproductive organs, are not always affected with structural changes of the genitalia as a result of infections, but may be wholly or partially infertile due to physiologic causes. Breeders will often continue the use of a proven sire, which has reached an advanced age. This practice is in a measure desirable and constructive breeding, but it must be judiciously performed, or the owner will suddenly and violently be awakened to the fact that he has a large number of cows with healthy reproductive organs, that have failed to conceive as the result of having been mated with a sire of reduced breeding efficiency. Advanced age, overfeeding, obesity or over condition as is frequently observed in cattle used for show purposes, together with lack of exercise, are all important factors in connection with sterility or failure to reproduce. The sire also may be rendered sterile as a result of injury to the sheath, penis or testicles, or from specific infections of the various genital organs. Tuberculosis of the male organs is occasionally observed, also actinomycosis, but the latter less frequently. Orchitis is not an uncommon condition in the
bull, the etiology of which is not always easily determined. In a certain percentage of cases, according to my own observations, it probably results from trauma, while in others, it is due to the invasion of various microorganisms, which in all probabilities, reach the testicle by way of the blood or lymph streams. Bacterium abortus is capable of producing acute and extensive inflammation, characterized by degeneration, necrosis and finally abscess formation of the testicle. In our laboratories this organism has been isolated once in orchitis of the bull and once in the boar, and in each instance in pure culture. Other pyogenic organisms particularly the streptococcus are no doubt important factors in the etiology of orchitis, also in the causation of inflammatory conditions of the seminal vesicles, a condition which according to Williams (6) is said to be an important factor in connection with breeding efficiency of the bull. The attention of stockmen, should be called to the importance of the sire in the problem of breeding efficiency, and to carefully guard his breeding ability, not only by careful feeding and management, but my mating him only with cows with healthy reproductive organs. He should also be subjected to periodical and regular physical examinations as well as occasional microscopical examinations of the semen. Impaired breeding efficiency of the sire as a result of infection of the genital organs, especially those conditions involving the epididymus and seminal vesicles, has not been frequently encountered in our investigations.


President Butler: The next paper is "The Experimental Production of Bang Abortion Diseases, with Lantern Slides" by Drs. R. R. Birch and H. L. Gilman. New York State Veterinary Col'lege, Ithaca, New York. Dr. Birch has done a great deal of work on the experimental production of Bang abortion disease, and I am sure his paper and the slides will bring us new information.

THE EXPERIMENTAL PRODUCTION OF BANG ABORTION DISEASE

R. R. Birch and H. L. Gilman.

Despite the fact that the primary function of this association is to deal with sanitary measures as they apply to infectious diseases of animals, we believe it is profitable from time to time to present briefly some of the basic facts regarding the nature of the diseases with which we are concerned, for it is only through the understanding of these facts that constructive sanitary measures may be undertaken.
Our paper today deals with Bang abortion disease and circumstances require that it shall be presented as a summary of one phase of experiments which we have been conducting. These experiments are described in detail in the report of the New York State Veterinary College, 1922-23, now in press. Without this background of detail we would be reluctant to summarize the experiments here.

For the sake of more exact expression we will in this paper refer to disease caused by Bact. abortum as Bang abortion disease, reserving the term infectious abortion as a more inclusive one embracing those manifestations caused by infection of whatever character, which regularly led up to death and premature expulsion of the fetus, or which are inseparably linked with this one outstanding symptom.

Briefly if one may judge by standard descriptions in various texts and bulletins, the conception held among the majority of investigators regarding the causes and nature of infectious abortion in cattle may be stated as follows:

Most of it is due to Bact. abortum, which is the cause of a specific infectious disease the most prominent symptom of which is the expulsion of the dead fetus; Bang abortion disease tends to be self limiting, especially in small herds, often disappearing entirely in the course of two or three years. This disappearance is due to a rather low grade and uncertain immunity which may fail in some individuals. In the individual pregnant cow the organism is localized in the uterine contents—especially in the utero chorionic space and in the chorion—and sometimes in the udder; it is eliminated in enormous numbers in the genital discharges of infected cows just before and for some weeks after the date when abortion, premature birth, or more exceptionally, full term calving takes place; it is eliminated regularly in the milk of some infected cows; it may gain entrance to a second female by way of the genital tract prior to or at the time of breeding but usually it enters with the food, is transferred to the lymph and blood streams and thus finds its way to the pregnant uterus. It often causes retention of the afterbirth, especially when expulsion of the fetus occurs in late pregnancy; and metritis, pyometra, salpingitis, and other manifestations that terminate in sterility are common sequelae which depend for their development on organisms other than Bact. abortum. Shy breeding and early abortions are regularly associated with these sequelae. Somewhat exceptionally other organisms cause disastrous genital infections which are not initiated by Bact. abortum.

For reasons that seemed to us sufficient we have considered it profitable to inquire into some of the statements that have long been regarded as established facts. It has seemed worth while to repeat some of the earlier experiments that have to do with the disease-producing power of Bact. abortum, using controls more freely than they have been used in the past, and checking up infections in the chorion and fetus more closely than earlier methods rendered possible.

From a sanitary standpoint the method of elimination of the virus of an infectious disease, the fate of the virus outside the animal body, and the channels through which the second host is invaded are of primary importance.
Bact. abortum is eliminated somewhat irregularly and in comparatively small numbers in the milk of infected cows, and in enormous numbers from the infected uterus for a limited time before and after the expulsion of the fetus or calf. It remains alive for a considerable length of time (several weeks) outside the animal body. What are the usual channels through which it invades a second host?

Time does not allow us to present even a brief review of the literature that has to do with this phase of Bang abortion disease. We must content ourselves with stating that the question has not been satisfactorily answered, and with presenting data that apply directly to the point in question.

Natural infection through the digestive canal, through the vagina and cervix, and through the teat canal have been given prominence among investigators. Due to the fact that heifers suffer more frequently than older cows, we think it reasonable to exclude the latter route as a usual channel of infection. Numerous investigators have presented data in units, some of which individually affirm or deny the digestive tract as a channel of entrance of Bact. abortum, and this statement applies with equal force to the vagina and cervix; but collectively the data seem to indicate that invasion may take place through either channel. It is of the very greatest importance though that we shall know something of the regularity with which Bact. abortum invades the pregnant uterus from the blood stream, for if this does not occur regularly, such failure would practically deny the digestive tract as a prominent channel of entrance; on the other hand, regular invasion of the pregnant uterus from this source would materially strengthen the probability that infection may take place per os subsequent to conception and destroy the fetus. If the pregnant uterus is invulnerable to bacterial invasion from without, then the pregnant cow needs no protection from infection except as it relates to future pregnancies; if it is vulnerable, then the cow must be carefully protected from infection during pregnancy.

We have used intravenous injections of suspensions of Bact. abortum in an effort to gain a clear conception of the regularity with which the organism invades the pregnant uterus from the blood stream. Controls have been kept, and in full recognition of individual exceptions, we assume that on the whole the only essential difference between the infected group and the controls is found in the fact that the former received live Bact. abortum organisms in the blood stream, while the latter did not. The following tables summarize the results:—Tables 1, 2, 3.

All cultures were carefully checked as to virulence. The term "injected" in the table indicates that 10 mils of a physiological saline solution suspension of Bact. abortum was introduced into the jugular. A plus sign signifies that Bact. abortum was demonstrated by culture or guinea pig inoculation or both. The term "exudite," used for convenience in tabulation, refers to uterine exudate or placental extract collected near the time when the fetus was expelled. A minus sign under this head means that guinea pig inoculations failed to reveal Bact. abortum. A minus sign under the column designated "milk" indicates that similar methods failed to demonstrate Bact. abortum. A minus sign in the column designated

(Continued on page 106)
# TABLE NO. I
## 1920 GROUP
### Infected Animals

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<th>CALVED</th>
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<th>Exudate</th>
<th>Milk</th>
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<td>July 12, 1920</td>
<td>June 24, July 16 and Aug. 7, 1920</td>
<td>Sept. 11, 1920 (183)</td>
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### TABLE NO. I (Continued)

#### 1920 GROUP

**Controls**

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<td>Sept. 29, 1921 (182)</td>
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<td>July 6, 1922 (280)</td>
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<td>88</td>
<td>Full term calf each year since 1913</td>
<td>Oct. 3, Nov. 20, Nov. 21, 1921 and May 9, 1922</td>
<td>Dec. 21, 1922 (Pregnant)</td>
<td>Dec. 22, 1922</td>
<td>Jan. 28, 1923</td>
<td>+</td>
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<td>Exudate, Milk, Fetus</td>
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<td>173</td>
<td>3 normal calves 1921—injected and calved</td>
<td>July 12, 1922 (213)</td>
<td>Dec. 2, 1922</td>
<td>Apr. 4, 1923</td>
<td>+</td>
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<td>Severe metritis</td>
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<td>1920—normal calf. Injected 3 times subcutaneously 1921—not injected. Calved</td>
<td>May 15, 1922 (213)</td>
<td>Nov. 6, 1922</td>
<td>Nov. 27, 1922</td>
<td>Jan. 20, 1923 (250)</td>
<td>+</td>
<td>Severe metritis</td>
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<tr>
<td>196</td>
<td>Virgin yearling (Immunized)</td>
<td>June 24, 1922 (200)</td>
<td>Nov. 8, 1922</td>
<td>Feb. 3, 1923</td>
<td>Mar. 1, 1923 (250)</td>
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<td>Virgin. Fed</td>
<td>June 22, 1922</td>
<td>Nov. 8, 1922</td>
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<td>1923</td>
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<td>Mar. 19, (270) Apr. 2,</td>
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<td>July 2, 1922</td>
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<td>1923</td>
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<td>July 15, 1922</td>
<td>Nov. 8, 1922</td>
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<td>1923</td>
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<td>Virgin</td>
<td>July 1, 1922</td>
<td>Nov. 8, 1922</td>
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<td>1923</td>
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<td>May 19, 1922</td>
<td>Nov. 8, 1922</td>
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<td>1923</td>
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<td>Mar. 7, 1922 (Outside)</td>
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<td>Mar. 7, 1922</td>
<td>June 1, 1922</td>
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<td>1923</td>
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<td>Aug. 13, 1922</td>
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<td>Sept. 12, Oct. 11, and Oct. 21, 1922</td>
<td>Nov. 8, 1922</td>
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<td>Apr. 13, 1923</td>
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<td>April 2,</td>
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<td>July 8, 1922</td>
<td>Nov. 8, 1922</td>
<td>(Pregnant)</td>
<td>Apr. 13, 1923</td>
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<td>8 years old. Last two calves normal. Pregnant</td>
<td>Mar. 1, 1922&lt;br&gt;(Outside)</td>
<td>June 1, 1922&lt;br&gt;(Pregnant)</td>
<td>June 1, 1922</td>
<td>June 22, 1922&lt;br&gt;(113)</td>
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<td>Severe metritis</td>
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<td>3 full term calves. Pregnant</td>
<td>No record&lt;br&gt;(Outside)</td>
<td>July 15, 1922&lt;br&gt;(Pregnant)</td>
<td>July 15, 1922</td>
<td>Aug. 13, 1922</td>
<td>+</td>
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<td>Arthritis</td>
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<td>227</td>
<td>Virgin</td>
<td>July 24, 1922&lt;br&gt;(200)</td>
<td>Nov. 8, 1922&lt;br&gt;(Pregnant)</td>
<td>Feb. 3, 1923</td>
<td>Feb. 9, 1923&lt;br&gt;(200)</td>
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<td>4 years old. Two normal calves. Pregnant</td>
<td>June 28, 1922&lt;br&gt;(Outside)</td>
<td>Nov. 27, 1922&lt;br&gt;(Pregnant)</td>
<td>Nov. 27, 1922</td>
<td>Dec. 29, 1922&lt;br&gt;(184)</td>
<td>+</td>
<td>Metritis</td>
<td>Arthritis</td>
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</tbody>
</table>
"fetus" means that guinea pig inoculation failed to reveal Bact. abortum in the fetal lung, liver, spleen, heart's blood, and in the contents of the abomasum, small intestine and rectum. The standard for differentiation between "calved" and "aborted" depends on the ability of the calf to stand and suck, but the gestation period and findings relative to the presence of Bact. abortum in the fetus and uterine contents should be thought of constantly in this connection. The numbers below the breeding date refer to the bull used and the ones below the date of calving or aborting refer to gestation period. These general remarks are applicable to Tables No. 1, 2 and 3.

Table No. 1 records what took place in the 1920 group. There were seven animals in the infected group and seven aborters. In five of these Bact. abortum was present in the uterine contents, and the other two were not examined. There were two abortions in the control group, and four live calves, two, at least, born prematurely. All the cows harbored Bact. abortum in the uterus. The animals in the infected group aborted first, and there is every evidence that they were instrumental in infecting the controls.

Table No. 2 represents a continuation of the work in the same herd during 1921. Most of the cows in the 1920 group were retained and others were added. Ten animals were infected intravenously. Eight aborted; six of these harbored Bact. abortum in the uterine contents, one was negative and one was not examined. The uterine exudate of one of the cows that calved was negative to Bact. abortum, that of the other was positive. Eight animals served as controls. Six of these calved normally, and in only one was Bact. abortum demonstrated; one aborted and the uterus was negative to Bact. abortum; Caesarean section was performed on one at full term and no laboratory examinations were made.

Table No. 3 extends the work of tables No. 1 and 2, but two additional elements enter in. An attempt was made to immunize six of the animals (virgin heifers) and ten virgin heifers, which included these six, were fed live Bact. abortum organisms in an attempt to infect them. "Immunized" and "fed" in the column designated "history" refer to these influences. Table No. 8 explains the handling of these heifers more in detail.

This table (No. 3) includes fifteen cows in the infected group. Twelve of these aborted, and three calved prematurely. Bact. abortum was present in the uterine contents of ten of the aborters and in the uteri of the three that calved prematurely. The control group likewise included 15 animals. Of these, one aborted and the fetus was positive to Bact. abortum. Fourteen calved at full term. Two were positive to Bact. abortum (uterus), ten were negative and two are still pregnant.*

Tables No. 4, 5, 6 and 7 summarize results of Tables No. 1, 2 and 3, ignoring a few animals in which pregnancy had not terminated, or in which laboratory examinations were not made.

Breeding histories of the bulls used in these experiments are included in the original paper to which we referred. The general plan has been to breed animals in the infected group, and in the control group to the

*But have calved at full term since.
### TABLE NO. 4

<table>
<thead>
<tr>
<th></th>
<th>1920</th>
<th>1921</th>
<th>1922</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injected and aborted</td>
<td>7</td>
<td>8</td>
<td>12</td>
<td>27</td>
</tr>
<tr>
<td>Not injected and aborted</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Injected and calved</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Not injected and calved</td>
<td>4</td>
<td>7</td>
<td>12</td>
<td>23</td>
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</tbody>
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### TABLE NO. 5

<table>
<thead>
<tr>
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<th>1920</th>
<th>1921</th>
<th>1922</th>
<th>Total</th>
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<tr>
<td>Injected and positive</td>
<td>7</td>
<td>7</td>
<td>13</td>
<td>27</td>
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<tr>
<td>Not injected and positive</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>9</td>
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<tr>
<td>Injected and negative</td>
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<td>2</td>
<td>4</td>
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<td>Not injected and negative</td>
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<td>6</td>
<td>10</td>
<td>16</td>
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### TABLE NO. 6

<table>
<thead>
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<th>1920</th>
<th>1921</th>
<th>1922</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injected, aborted, —</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Injected, calved, —</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Injected, aborted, +</td>
<td>7</td>
<td>6</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>Injected, calved, +</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Not injected, aborted, —</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Not injected, calved, —</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Not injected, aborted, +</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Not injected, calved, +</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

### TABLE NO. 7

**Inoculated Animals**

<table>
<thead>
<tr>
<th></th>
<th>1920</th>
<th>1921</th>
<th>1922</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average days pregnant before injection</td>
<td>109</td>
<td>132</td>
<td>192</td>
<td>144</td>
</tr>
<tr>
<td>Average days pregnant after injection</td>
<td>59</td>
<td>72</td>
<td>37</td>
<td>56</td>
</tr>
</tbody>
</table>

**Controls**

Average days pregnant after a day corresponding to the days pregnant in the inoculated animals previous to inoculation (109th in 1920, 132nd in 1921, 192nd in 1922) | 146 | 149 | 87 | 127 |
same bulls, so that any influence exerted by the sire would be brought to bear equally on both groups. There are a few individual departures from this rule.

Both in the infected group and in the controls staphylococci, streptococci and rods have been isolated from placenta or fetus in a minority of the examinations, in each case in association with Bact. abortum. These have not appeared throughout the fetus as a general infection, but in an occasional tube inoculated from a single organ, probably as a contamination. At any rate, these organisms had an equal opportunity in infected animals and controls to destroy the fetus and cause its premature expulsion. Most of the animals in the infected group aborted, and most of the controls did not.

It would be interesting to trace the histories of some of these cows, in their relation to agglutination tests and other essential or supplementary considerations, and to trace herd history as it makes contact with the problem of immunity, but here we must content ourselves with the conclusion that Bact. abortum, when once it reaches the blood stream, can and does regularly invade the pregnant uterus from this source and bring about death and expulsion of the fetus.

Table No. 8 has to do with Bact. abortum infection by way of the digestive tract—and incidentally as far as this paper is concerned—with the problem of immunity. This table includes fifteen virgin heifers. They were bred and pregnancy was verified. Six were immunized by subcutaneous injection of suspensions of live Bact. abortum organisms, four were used as controls in relation to immunity and five were used as association animals, being neither immunized nor fed live organisms.

The term “uterine contents,” which appears in the remarks, refers to fetus, uterine exudate, or both. Details may be obtained by looking up the individual cows as they appear in Table No. 3.

The six heifers in the “immunized and fed” group were given capsules containing each 10 mils physiological saline solution suspension of Bact. abortum. These were administered about every second day between the dates indicated in the table. After this feeding had continued approximately two months three of the animals were infected intravaneously. Two of these aborted and one calved prematurely. The three that were immunized and fed living organisms, but not infected intravaneously, calved at full term, and Bact. abortum was not isolated from the uterine contents. Agglutination records suggest that heifers No. 195 and 204 were probably infected by the organisms fed, but it appears that the uteri were not invaded.

Of the four non-immunized controls, two received subsequent to feeding intravenous inoculation of live Bact. abortum organisms. One (206) aborted; the other (207) calved at 260 days. The aborted fetus of 206 was negative to Bact. abortum and the uterine exudate was not examined. The uterine exudate of No. 207 contained Bact. abortum. Of the two animals in this group in which pregnancy was not molested by intravenous infection (197 and 198), 197 showed a clean breeding record and uterine contents negative to Bact. abortum. No. 198 calved at 270 days, suffered with dystocia, and the uterine exudate contained Bact. abortum.
## TABLE NO. 8

Showing handling of 15 virgin heifers in attempts to infect by feeding suspensions of Bact. abortum. An attempt was made to immunize six of the heifers before the suspensions were fed.

<table>
<thead>
<tr>
<th>HEIFER NO.</th>
<th>SUBCUTANEOUS INFECTIONS</th>
<th>BACT. ABORTION SUSPENSIONS</th>
<th>BREEDING DATE</th>
<th>INCLUSIVE FEEDING DATES</th>
<th>INTRA-VENOUS INJECTION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nov. 14, 1921—10 mils</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov. 14, 1921—10 mils</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov. 14, 1921—10 mils</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov. 14, 1921—10 mils</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov. 14, 1921—10 mils</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEIFER NO.</td>
<td>SUBCUTANEOUS INFECTIONS BACT. ABORTUM SUSPENSIONS</td>
<td>BREEDING DATE</td>
<td>INCLUSIVE FEEDING DATES</td>
<td>INTRAVENOUS INJECTION</td>
<td>REMARKS</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
<td>----------------</td>
<td>-------------------------</td>
<td>-----------------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>228</td>
<td>Sept. 12, Oct. 11, and Oct. 31, 1922</td>
<td></td>
<td></td>
<td>Now 7 months pregnant.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The records of the association animals, neither immunized nor fed, need little amplification. It should be remarked that heifer No. 228 conceived only with difficulty, and had not yet calved when the experiment terminated. She has since calved at full term, but has developed a high agglutination reaction, indicating probable infection. Due to delayed conception, she was exposed to infection much longer than the other heifers in the group.

Agglutination records of some of the heifers will aid materially in understanding the progress of infection in individuals in the group. Heifers No. 195, 196, 198 and 204 are included.

Nearly all the heifers that were fed the suspensions of live organisms showed blood agglutination somewhat higher subsequently, but with the exception of the four included, the advance in the agglutinating value of the blood was slight. The experiments would have given more information regarding the digestive canal as a channel of infection had infection been attempted earlier in the gestation period.

An interesting comparison as it relates to natural infection, and to immunity as well is found in Table No. 10:

The heifers in the 1920 group were in contact with aborting cows for the first time. Those in the 1921-22 group had each been definitely infected the year before as evidenced by the presence of Bact. abortum in uterine exudate or fetus, and they likewise were subjected during pregnancy to close association with aborting cows. The animals in the latter group were approximately one year older than those in the former. Of the six pregnant heifers associated for the first time with aborting cows, two aborted, two calved prematurely and two calved approximately at full term. All revealed Bact. abortum in the uterine exudate, fetus, or both. Of the eleven pregnant cows infected the previous year and associated with aborting cows subsequently, one aborted and Bact. abortum was not recovered from the uterine exudate and fetus. The other ten calved at full term and Bact. abortum was recovered from the uterine exudate of only one.

On the whole the experiments indicate that infection with Bact. abortum sometimes takes place through the digestive tract, but so far our work does not satisfactorily explain the rapid spread of Bang abortion disease through a herd on the basis of natural infection through the digestive canal. It seems to indicate clearly, though, that infection takes place in some manner subsequent to the time of breeding. Others have infected pregnant cows readily by way of the digestive tract, but more numerous failures in this regard are on record. There is still something to learn regarding the usual channel of infection as it applies to Bact. abortum.

This paper is a summary and as such is necessarily subject to limitation. Because of these limitations we prefer not to include certain conclusions which the original paper contains: but if the data here submitted are instrumental merely in emphasizing the fact that the pregnant cow requires careful protection from infection which possesses the specific power to invade the uterus and destroy the fetus their presentation before this group of sanitarians will be deemed worth while. Certainly to the practicing veterinarian and cattle owner they suggest the greatest caution.
in regard to permitting infected and sound animals to associate; what they suggest in the way of official sanitary measures, others more experienced must decide.

Our subject today is definitely bounded by the influence of Bact abortum in producing disease in cattle. This is but one phase, though an important one, of genital infection as a whole, but in order to prevent possible misunderstanding we desire to state with all the emphasis of which we are capable, that destructive local infections in the genitals occur both in association with and independent of Bact. abortum. In any particular herd the veterinarian is obligated to learn the nature of the infection with which he is dealing. If it is a local genital infection transmitted by the bull, or otherwise, measures for its control must be governed accordingly; if it is caused by an organism which possesses the specific power to invade the pregnant uterus, local treatment alone—though it plays an important part—will not suffice.
The cows in the 1920 group were sustaining their first contact with Bact. abortum infection (aborters). Those in the 1921-22 groups were exposed similarly, but each animal had a definite record of previous uterine infection. Those in the latter group were approximately 1 year older than those in the 1920 group.

### 1920 GROUP

<table>
<thead>
<tr>
<th>COW</th>
<th>HISTORY</th>
<th>BRED</th>
<th>CALVED</th>
<th>ABORTED</th>
<th>BACT. ABORTUM IN UTERINE CONTENTS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>173</td>
<td>Virgin</td>
<td>Apr. 24, 1920 (182)</td>
<td>Jan. 29, 1921 (280)</td>
<td>+</td>
<td>Metritis</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>Virgin</td>
<td>May 13, 1920 (182)</td>
<td>Feb. 9, 1921 (272)</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COW</td>
<td>HISTORY</td>
<td>BRED</td>
<td>CALVED</td>
<td>ABORTED</td>
<td>BACT. ABORTUM IN UTERINE CONTENTS</td>
<td>REMARKS</td>
</tr>
<tr>
<td>-----</td>
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<td>------</td>
<td>--------</td>
<td>---------</td>
<td>----------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>174</td>
<td>Infected 1920</td>
<td>June 9, 1921</td>
<td>Mar. 16, 1922</td>
<td>+</td>
<td>Metritis (died)</td>
<td></td>
</tr>
<tr>
<td>179</td>
<td>Infected 1920</td>
<td>Mar. 1, 1921</td>
<td>Nov. 22, 1921</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>Infected 1920</td>
<td>Sept. 29, 1921</td>
<td>July 6, 1922</td>
<td></td>
<td>Milk contained Bact. abortum</td>
<td></td>
</tr>
<tr>
<td>184</td>
<td>Infected 1920</td>
<td>Mar. 21, 1921</td>
<td>Dec. 31, 1921</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>185</td>
<td>Infected 1920</td>
<td>Mar. 12, 1921</td>
<td>Dec. 25, 1921</td>
<td></td>
<td>Dystocia Calf dead</td>
<td></td>
</tr>
<tr>
<td>187</td>
<td>Infected 1920</td>
<td>May 31, Aug. 6, and Aug. 24, 1921</td>
<td>June 6, 1922</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>189</td>
<td>Infected 1920</td>
<td>Sept. 22, 1921</td>
<td>June 29, 1922</td>
<td></td>
<td>Milk contained Bact. abortum</td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>Infected 1921</td>
<td>Feb. 20, 1922</td>
<td>Dec. 2, 1922</td>
<td></td>
<td></td>
<td></td>
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<td>177</td>
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<td>May 17, 1923</td>
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<td></td>
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<td>Mar. 29, 1922</td>
<td>Jan. 10, 1923</td>
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<td></td>
</tr>
<tr>
<td>188</td>
<td>Infected 1920-1921</td>
<td>May 21, 1922</td>
<td>Feb. 25, 1923</td>
<td></td>
<td>Bact. abortum in milk</td>
<td></td>
</tr>
</tbody>
</table>
President Butler: The next paper on the program is “Regulatory Measures in the Control of Abortion in Cattle” by Dr. J. W. Connaway, University of Missouri, Columbia, Mo. We may rest assured that whatever Dr. Connaway has to say will be delivered in a very forceful manner. We may not always agree with what Dr. Connaway says, but there is one thing, and that is that he is never in doubt as to what he has to say. Another thing that we may rest assured of when Dr. Connaway reads a paper is that it will bring out a good, vigorous discussion. It will pay each and every one of us to pay very close attention to what Dr. Connaway has to say. (Dr. Connaway’s paper is not available as this report goes to press.)

President Butler: The next paper is the report of the Committee on Abortion Diseases by Dr. C. P. Fitch, Chairman. I consider the report that Dr. Fitch made last year as one of the finest reports I ever heard in my life. Dr. Fitch has had an excellent Committee to work with this year, and I know they have worked on this subject faithfully, and while we are somewhat in the dark and undecided as to how best control abortion disease, we may rest assured that this Committee will advise us of anything new that has been brought to light the past year on abortion disease.

REPORT OF THE COMMITTEE ON ABORTION 1923

Last year your committee made a report in which two things were stressed as being of the greatest importance in the control of abortion in cattle. These were (1) education of the people of the country, especially the live stock owning public, as to the importance of the disease and the facts already known concerning it, and (2) increased efforts to promote research and further study of the problem of the diseases of the genitalia. The passing of time has shown that this program is of paramount importance. Your committee this year desires to call attention to another phase of the control of Bovine Infectious Abortion.

It has been demonstrated in our work with tuberculosis that before adequate control methods can be successfully applied, the public must be instructed in the fundamental facts of the biology of the disease. This is particularly true of a condition so imperfectly understood by the laity as Bovine Infectious Abortion. It is true that many facts in the biology of infectious abortion are not yet known, but the same is true of several other maladies which are being successfully combatted. Enough facts have been clearly shown to substantiate the statement that there is a specific disease of cattle due to a particular germ, Bact. abortus Bang. It is a part of the functions of this association to outline regulatory measures tending toward the control of such disease if deemed advisable. The discussion of the paper on regulatory measures should bring out the attitude of the association on this point. It should be kept clearly in mind, however, that efficient control measures must be either preceded or joined with a campaign of education with regard to the disease. It is not the first time that this matter has been before this group. Your committee in 1918 presented a report dealing with control measures. At that time official action was not deem advisable. The five years elapsing have brought additional knowledge and some states have already adopted regulations, governing the ad-
mission of cattle in respect to this disease. The work of your committee this year has consisted largely in the arrangement of the program on Bovine Infectious Abortion and attempting to direct the discussion on this subject. Your committee is not making definite recommendations in regard to regulatory control, but it is bringing the matter before you in order that it may be freely and frankly discussed, thus, we hope, placing the matter in a clearer light.

Your committee this year recommends two things:

(1) That this association recommend to the educational forces of the Federal Government, the various states and any other interested agencies, that greater efforts be made to inform the live stock owning public concerning this infection.

(2) That this association through all its membership give its earnest support to obtaining larger financial assistance for the further study and investigation of this disease and other infections of the genitalia.

COMMITTEE:

E. C. SCHROEDER.
R. R. BIRCH.
J. TRAUM.
J. W. CONNAWAY.
WARD GILTNER.
J. F. DEVINE.
C. P. FITCH, Chairman.

President Butler: The subject of Abortion Disease is now open for discussion.

Friday, Dec. 7, 1923, 9:00 a.m.

President Butler: The hour of 9:00 a.m. having arrived, the meeting will please come to order. The entire morning session and such parts of the afternoon session as is necessary will be devoted to the subject of tuberculosis. We have an extensive program on this subject, and it may not be possible to get through with it all this forenoon. Whatever we do not finish this morning we will take up this afternoon, but I believe that by working through until two o'clock that we may be able to get through with this subject in a satisfactory manner, so that the afternoon session may be given over entirely to business of the Organization and Election of Officers. That, however, is a matter for you to decide, and a motion for a recess will be in order at any time. The first paper on the program this morning is the "Present Status of Co-operative Tuberculosis Eradication Work" by Dr. J. A. Kiernan, Chief T. B. Eradication Division, U. S. Bureau of Animal Industry. I believe that every veterinarian in the United States appreciates the work that Dr. Kiernan is carrying on. Certainly we do know that he is giving every ounce of his strength to this work, and that he is directing a work that will go down in history as one of the greatest ever undertaken by the veterinary profession.
PROGRESS AND STATUS OF COOPERATIVE TUBERCULOSIS
ERADICATION WORK

Dr. J. A. Kiernan, Chief,
Tuberculosis Eradication Division,
Bureau of Animal Industry,

This meeting is the sixth anniversary of the adoption of the accredited-herd plan which we may call the Magna Charta for the live stock industry of the United States. As the yoke of oppression was cast off by the free-men of England in 1215 at Runnymead, so in 1917 a bill of rights was adopted in Chicago to enable our live stock owners to produce and develop their herds unhampered and unhandicapped by the devitalizing ravages of tuberculosis.

Six years is but a brief span in the tide of time, and yet, within that period momentous events have transpired. Many of us can vividly recall the determination with which many live stock owners opposed for years any effort made to eradicate tuberculosis along lines that promised lasting results. Today, even a casual study of the situation shows that the vast majority of the live stock owners are intensely interested in this subject and are proceeding with eradication measures in an intensive way.

Why there should be such a sudden and almost unanimous change of sentiment is a matter that is of great interest and worthy of careful study. The antagonism toward tuberculosis eradication is fast dying out. Many of its former opponents have now become its strongest adherents. Surely this great evolution of sentiment must be due to a clearer understanding of the entire subject; the cause of the disease, the losses it entails, the methods for its detection, and the possibility of extermination. The process of educating the masses is a slow one, and many times a discouraging one. There are few, if any, instances in nation-wide endeavor to accomplish a great piece of work that have better demonstrated the ability of the public to study and analyze the subject than the campaign for the extermination of tuberculosis. When the historian records this campaign, it is our belief that he will lay emphasis on the fact that it proceeded rapidly because of the intelligent understanding with which the live stock owners viewed it. He will not have to delve far into the records to find the names of such leaders as Salmon, Pierson and others, who blazed the trails in this country for a tuberculosis-free live stock industry.

The contemporaneous workers who are directing campaigns in their States and in our sister country to the North are working under the inspiration of our leaders of former days, who saw the necessity of eradicating tuberculosis and did all they could during their time to point out the way in which it should be accomplished. We have this to be proud of.
Most of the hard preliminary pioneer work done in this country for this great movement was performed by members of our profession. It is, indeed, a fortunate circumstance that we have 48 States to share in the responsibility of this campaign. Furthermore, we have 48 units exercising their sovereign rights under the constitution to control and eradicate, or handle as they choose within their confines, infectious diseases of live stock. All States have adopted the uniform accredited herd plan, and are abiding by its provisions. Nevertheless, there are many angles of the subject that cannot be regulated by an association like this or by any other organization. The legislature of each State determines how revenues shall be raised and how funds shall be expended.

Benefits of Experimental Work

It is a great thing, especially for this work, to have many State veterinarians proceed along various administrative and experimental lines. We must all admit that at no time up to the present has the best method been decided upon to eradicate tuberculosis. There are variations in different sections, and it is well that the 48 States are trying out their experiments. It is a happy condition of affairs when we can come to a meeting like this and exchange ideas and compare various methods that have been in operation.

To illustrate the benefits derived by experimental work you no doubt recall how some of our members came here year after year extolling the advantages of the intradermic test. Their experience demonstrated to them that this method of using tuberculin was as reliable as the subcutaneous method, and that a great deal more work could be accomplished by an operator in the same period of time. Many doubted the efficiency of the intradermic test, and it took years of experimental testing to settle the question. Today, however, all are convinced of the reliability of the intradermic test in the hands of the competent operator. The use of the ophthalmic method of testing was demonstrated in the same way, but there still remains a doubt in the minds of some as to the reliability of the ophthalmic as a single test compared with either the subcutaneous or intradermic test.

Campaign Policies

The broad policies agreed upon for the tuberculous campaign, for example, the area plan, did not specifically restrict it to dogmatic rules, but left it largely to the judgment of the State officials. For instance, the feasibility of tuberculin testing all the cattle within a circumscribed area was doubted by some a few years ago. The idea of getting 100% of the cattle owners to consent to the testing of their herds and the practicalness of getting around to every farm in a county seemed rather visionary. The question was whether this work would begin by assigning one veterinarian to a county to work many months or a large number of veterinarians detailed to accomplish the testing within a few weeks. Both methods have been tried and both have been found successful. It is a matter of choice with the State and local officials as to how area work is carried on. It seems that in counties where infection is not high, the drive plan has advantages over the slower method. However, in counties where infection
is extensive, the matter of cost of indemnity must be taken into consideration. For instance, in the case of a county with 75,000 cattle, 50 per cent of which are tuberculous and where the average indemnity for reactors is $40, it would be suicidal to place a sufficient number of veterinarians to test all the cattle within a period of 30 days, as the indemnity alone would amount to $1,500,000. In this connection there is serious doubt in the minds of many as to the advisability of even attempting to eradicate tuberculosis in a territory that is in such a sad plight. The fact that 50 per cent of the cattle react to the initial test is almost a guarantee that before the disease could be eradicated, even in the herds and cattle that were involved at that time, the percentage would increase to upwards of 75, and when that condition is encountered, it might be just as well to condemn all the cattle to begin with—it would save time and expense. But such counties should not be entirely ignored. A good way to handle them would be to place an absolute quarantine around them, and when the rest of the State is practically cleaned up, work out a plan for solving the problem.

In many of the States the area plan has gained a solid foothold and the campaign will be continued along that line, subordinating to a large degree the promiscuous testing of individual herds. It is not inferred that no work should be done outside of areas. It is necessary to do a sufficient amount of testing in each county for the purpose of demonstrating that the disease can be eradicated. These centers of free herds are the sentiment builders that stimulate a desire on the part of the live stock owners to attempt the area work. Two groups of veterinarians could be maintained in each State, a mobile group for area work and another unit for scattered accredited-herd work. This would appear to be the desirable way in which to carry on the campaign.

GRAPHIC PRESENTATION OF TUBERCULOSIS ERADICATION

As the purpose of this paper is to report the progress of and the present status of the cooperative tuberculosis-eradication campaign, the subject is presented largely by the use of charts. Inasmuch as statistics are used freely, it is believed that rather than to display a mass of figures on the charts, summaries would be given and, where possible, comparisons made by various diagrams. Figures on which the charts are based will be found in the mimeographed sheets that have been distributed.

In order that you may visualize the charts as they are presented, each one will be briefly referred to so as to indicate how the totals and conclusions were arrived at.

CHART 1

Annual Growth of the Work

Chart 1 illustrates the growth of the work each year since its inauguration. The number of cattle tested during 1918, the first year of the work, is comparatively small, as most of the time was devoted to visits to the various States in arranging for the work.

You will observe that in 1918 the number of cattle tested is indicated in connection with the smallest figures on the chart. Each year the total cattle tested increased, and in 1923 almost three and one-half million cattle were tested.
You will observe also from the summary for October, 1923, that there were tested between four and five hundred thousand cattle, or at the rate of about five million cattle annually. The number of animals tested per annum has not anywhere reached the maximum.

It is believed that within the next year, possibly the monthly summaries will show somewhere around one million cattle per month. At that rate it is not hard to comprehend that all the cattle in the United States may be tested within a reasonable length of time and, with the removal of reactors and the retesting of the infected herds, the disease can be gradually eliminated, as is shown in Chart 2.

**CHART 2**

**Cleaning Up Badly Infected Herds**

The information in Chart 2 was obtained from various State and Bureau offices; it covers a reasonably large number of herds and cattle, and is considered a fair average of the progress made in cleaning up the disease in badly infected herds. If the information had been obtained for herds containing 10 per cent or less of infected animals, it would show that those herds were cleaned up much more rapidly, but with deep-seated infection of approximately 31 per cent, we all appreciate the fact that progress cannot be made very rapidly. Of course, it would be more desirable to show in the fourth test the same number of herds found in the previous tests. The information could not be obtained in that way. If sufficient time had elapsed, no doubt we could present the fifth test with approximately as large a number of herds as in the prior tests, but we believe that the averages would be approximately the same.

**CHART 3**

**Remote Causes of Infection**

Naturally, the road of the veterinarian engaged in the eradication of tuberculosis is not strewn with roses. Some thorny paths are encountered, and it is the purpose of Chart 3 to show the obstinacy with which infection continues in some herds, notwithstanding every effort to detect and eliminate the sources of the continued reinfection. We have all encountered such herds and many hours of anxiety have been spent in an effort to solve the source of the infection. We know of many cases of reinfection in herds, the most prominent of which is the addition of untested cattle from herds, the health status of which is unknown. Dr. E. C. Schroeder has pointed out several times many routes of the dissemination of the infection, and if the veterinarian assigned to investigate the causes of the infection in herds possessed all the knowledge regarding the exposure and the true history of each animal in the herd, at least 95 per cent of these perplexing problems could be solved. A more careful study is essential in every such case.

**PERSISTENT TUBERCULOSIS INFECTION IN HERDS UNDER SUPERVISION AND THE CAUSE**

With a view of ascertaining some of the more important causes of unsatisfactory results being obtained in eradicating tuberculosis in certain herds, the Bureau requested the field offices to submit reports on herds
where progress was unsatisfactory. There is listed below the history of a number of such herds, with a view that inspectors engaged in tuberculosis work may profit by the experience of other employees and thus make their work more effective. It is thought that, perhaps, this information would also be of interest to herd owners who might avoid making similar mistakes.

1. Exposure at County Fair

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>38</td>
<td>2</td>
<td>5.3</td>
</tr>
<tr>
<td>1st retest</td>
<td>36</td>
<td>2</td>
<td>5.6</td>
</tr>
<tr>
<td>2nd retest</td>
<td>37</td>
<td>11</td>
<td>29.7</td>
</tr>
<tr>
<td>3rd retest</td>
<td>.31</td>
<td>3</td>
<td>9.7</td>
</tr>
<tr>
<td>4th retest</td>
<td>.51</td>
<td>4</td>
<td>7.8</td>
</tr>
<tr>
<td>5th retest</td>
<td>.48</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>6th retest</td>
<td>.43</td>
<td>1</td>
<td>2.3</td>
</tr>
</tbody>
</table>

After the first retest had been applied, 13 cattle were exhibited at a county fair and 11 of them stood facing a herd that later all reacted. The peculiar circumstance in this connection in that the 11 animals that reacted were the same ones that faced the infected herd, while the other two that were stalled elsewhere passed clean.

2. Contaminated Stream in Pasture

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>24</td>
<td>6</td>
<td>25.0</td>
</tr>
<tr>
<td>1st retest</td>
<td>36</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>2nd retest</td>
<td>32</td>
<td>4</td>
<td>12.5</td>
</tr>
<tr>
<td>3rd retest</td>
<td>33</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>4th retest</td>
<td>.37</td>
<td>6</td>
<td>16.2</td>
</tr>
</tbody>
</table>

A stream flows through the pasture into which the waste from several creameries empties. The toll of reactors is heavy in the fall, while light, or comparatively so, in the spring, after the cattle have not had access to the pasture and stream. The cause of the trouble is self-explanatory and the owner has been advised to this effect.

3. Herd Additions

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>.22</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>1st retest</td>
<td>.19</td>
<td>5</td>
<td>26.3</td>
</tr>
<tr>
<td>2nd retest</td>
<td>.19</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>3rd retest</td>
<td>.25</td>
<td>2</td>
<td>8.0</td>
</tr>
<tr>
<td>4th retest</td>
<td>.65</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>5th retest</td>
<td>.72</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

The seven reactors were herd additions, all of which came from herds afterwards found to be badly infected.
4. Careless Handling

<table>
<thead>
<tr>
<th>Test</th>
<th>Cattle</th>
<th>Reactors</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>68</td>
<td>14</td>
<td>20.6</td>
<td></td>
</tr>
<tr>
<td>1st retest</td>
<td>83</td>
<td>43</td>
<td>51.8</td>
<td></td>
</tr>
<tr>
<td>2nd retest</td>
<td>37</td>
<td>11</td>
<td>29.7</td>
<td></td>
</tr>
</tbody>
</table>

This is a herd which was tested for years and the reactors not removed. The first test revealed 17 calves out of 43 reactors which had been housed in a shed where reactors were held. This is one of our problems, that is, testing herds where reactors have been retested and placed back in herds, with such results as above indicated.

5. Infected Water in Lake

<table>
<thead>
<tr>
<th>Test</th>
<th>Cattle</th>
<th>Reactors</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>185</td>
<td>57</td>
<td>30.8</td>
<td></td>
</tr>
<tr>
<td>1st retest</td>
<td>152</td>
<td>51</td>
<td>33.6</td>
<td></td>
</tr>
<tr>
<td>2nd retest</td>
<td>99</td>
<td>8</td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td>3rd retest</td>
<td>83</td>
<td>11</td>
<td>13.3</td>
<td></td>
</tr>
<tr>
<td>4th retest</td>
<td>71</td>
<td>0</td>
<td>.0</td>
<td></td>
</tr>
<tr>
<td>5th retest</td>
<td>82</td>
<td>0</td>
<td>.0</td>
<td></td>
</tr>
</tbody>
</table>

The cause of continued infection in this herd was traced to a small lake where the cattle used to stand for hours at a time. There was a number of large oaks which afforded shade, thereby keeping the sunlight from the droppings. The lake was fenced off and the cattle not permitted to drink the water, with the result that the last two tests were clean.

6. Silage Infected From Hog Litter

The following extract is taken from a report on a herd where tuberculosis continued to be found when each test was applied.

"While applying the triple combination test to this herd I deemed it advisable to apply an intradermic test at the same time to all the swine on the place. Eight hogs were injected with tuberculin and six showed a very decided reaction and two rather suspicious. One of these hogs has already been slaughtered and showed very marked lesions in the bronchial lymph glands and lungs. While on the farm making the investigation I learned that it was a common practice for the attendants taking care of the hogs to get into the silo with their feet, which had been contaminated from the hog litter, and this may be the source of the infection which persists in this herd."
7. Possible Infection From Human Source

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>17</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>1st retest</td>
<td>27</td>
<td>10</td>
<td>37.0</td>
</tr>
<tr>
<td>2nd retest</td>
<td>18</td>
<td>1</td>
<td>5.6</td>
</tr>
</tbody>
</table>

The owner of this herd, a physician, could not account for the source of infection. He finally stated that one of his negro helpers living in a house located in the pasture had died of intestinal tuberculosis during the year. The patient began living there shortly after the herd was tested the first time. The house mentioned above had no fence around it, thus giving the cows a chance to graze right up to the door. While this may not be the source of infection, it gives much food for thought.

8. Lack of Cooperation by Owner

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>97</td>
<td>29</td>
<td>29.9</td>
</tr>
<tr>
<td>1st retest</td>
<td>80</td>
<td>24</td>
<td>30.0</td>
</tr>
<tr>
<td>2nd retest</td>
<td>44</td>
<td>5</td>
<td>11.4</td>
</tr>
<tr>
<td>3rd retest</td>
<td>52</td>
<td>3</td>
<td>5.8</td>
</tr>
<tr>
<td>4th retest</td>
<td>58</td>
<td>12</td>
<td>20.7</td>
</tr>
<tr>
<td>5th retest</td>
<td>56</td>
<td>8</td>
<td>14.3</td>
</tr>
</tbody>
</table>

Many reactors in first retest were additions which were not tested before entering herd. Breeding sows were kept in cow stable and skim milk from creamery fed to sows which contaminated the surroundings and feed which the cattle consumed. Trouble in the herd shows lack of cooperation of owner.

9. Herd Additions

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>22</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>1st retest</td>
<td>28</td>
<td>4</td>
<td>14.3</td>
</tr>
<tr>
<td>2nd retest</td>
<td>30</td>
<td>0</td>
<td>.0</td>
</tr>
</tbody>
</table>

Three of the four reactors on the first retest were herd additions on an interstate shipment, and the temperatures indicated they should have been classed as suspicious, if not as reactors. Copies of these charts were not forwarded to the Bureau as required, and therefore escaped detection.

10. Herd Additions

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>22</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>1st retest</td>
<td>28</td>
<td>1</td>
<td>3.6</td>
</tr>
<tr>
<td>2nd retest</td>
<td>32</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>3rd retest</td>
<td>38</td>
<td>1</td>
<td>2.6</td>
</tr>
<tr>
<td>4th retest</td>
<td>40</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>5th retest</td>
<td>62</td>
<td>32</td>
<td>51.6</td>
</tr>
</tbody>
</table>

The foregoing infection is accounted for through herd additions.
11. Herd Additions

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Reactors Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>66</td>
<td>6</td>
<td>9.1</td>
</tr>
<tr>
<td>1st retest</td>
<td>76</td>
<td>20</td>
<td>26.3</td>
</tr>
<tr>
<td>2nd retest</td>
<td>69</td>
<td>9</td>
<td>13.0</td>
</tr>
<tr>
<td>3rd retest</td>
<td>56</td>
<td>2</td>
<td>3.6</td>
</tr>
<tr>
<td>4th retest</td>
<td>65</td>
<td>3</td>
<td>4.6</td>
</tr>
<tr>
<td>5th retest</td>
<td>73</td>
<td>12</td>
<td>16.4</td>
</tr>
</tbody>
</table>

On the fourth retest three of original herd reacted, one of which was held over and placed in quarantine, but, due to the careless manner in which this herd was handled, this cow was placed back into the herd with the results of the fifth retest self-explanatory.

12. Reactors Not Removed

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Reactors Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>39</td>
<td>14</td>
<td>35.9</td>
</tr>
<tr>
<td>1st retest</td>
<td>29</td>
<td>3</td>
<td>10.3</td>
</tr>
<tr>
<td>2nd retest</td>
<td>35</td>
<td>8</td>
<td>22.9</td>
</tr>
<tr>
<td>3rd retest</td>
<td>29</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4th retest</td>
<td>30</td>
<td>14</td>
<td>46.7</td>
</tr>
<tr>
<td>5th retest</td>
<td>18</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Two years before this herd was placed under State and Federal supervision, a test was applied which revealed one reactor which was marked "suspicious" and placed back in the herd without retest. On the second test applied to this animal, it reacted and was shown to be a generalized case.

13. Reactors Not Removed

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Reactors Number</th>
<th>Reactors Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>62</td>
<td>20</td>
<td>32.3</td>
</tr>
<tr>
<td>1st retest</td>
<td>117</td>
<td>9</td>
<td>7.7</td>
</tr>
<tr>
<td>2nd retest</td>
<td>108</td>
<td>14</td>
<td>13.0</td>
</tr>
<tr>
<td>3rd retest</td>
<td>155</td>
<td>21</td>
<td>13.5</td>
</tr>
<tr>
<td>4th retest</td>
<td>85</td>
<td>45</td>
<td>*52.9</td>
</tr>
</tbody>
</table>

*Unofficial.

The unusual results of the above tests may be explained as follows:
(a) Mismanagement of herd, including divided authority, precluding the carrying out of instructions. (b) Insanitary surroundings, including lack of proper disinfection and the use of a surface tank for stock water, into which drained water from cow lot and manure pile from cow barn. (c) The keeping of reacting bulls on premises. (d) Permitting calves to run with the reacting dams in a so-called segregated herd until several months old, and then testing them and, if not reacting, placing them in the supervised herd.
14. Infected Water, Reacting Bulls, etc.

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Number Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>119</td>
<td>5</td>
<td>4.2</td>
</tr>
<tr>
<td>1st retest</td>
<td>133</td>
<td>5</td>
<td>3.8</td>
</tr>
<tr>
<td>2nd retest</td>
<td>152</td>
<td>10</td>
<td>6.6</td>
</tr>
<tr>
<td>3rd retest</td>
<td>90</td>
<td>12</td>
<td>13.3</td>
</tr>
</tbody>
</table>

This owner maintains a “Bang” herd, which contains 27 head of cattle. The continued infection is believed to be due to the way it is managed with reference to the “Bang” herd and herd additions.

15. Poor Management of “Bang” Herd

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Number Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>286</td>
<td>28</td>
<td>9.8</td>
</tr>
<tr>
<td>1st retest</td>
<td>338</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>2nd retest</td>
<td>376</td>
<td>88</td>
<td>23.4</td>
</tr>
<tr>
<td>3rd retest</td>
<td>330</td>
<td>5</td>
<td>1.5</td>
</tr>
<tr>
<td>4th retest</td>
<td>286</td>
<td>5</td>
<td>1.7</td>
</tr>
<tr>
<td>5th retest</td>
<td>374</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>6th retest</td>
<td>404</td>
<td>21</td>
<td>5.2</td>
</tr>
<tr>
<td>7th retest</td>
<td>418</td>
<td>4</td>
<td>1.0</td>
</tr>
</tbody>
</table>

A “Bang” herd is maintained by this herd owner. On the sixth retest, of the 21 reactors found, 15 were calves which had been fed on “so-called pasteurized milk” secured from the “Bang” herd.

16. Poor Management of “Bang” Herd

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Number Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>.31</td>
<td>9</td>
<td>29.0</td>
</tr>
<tr>
<td>1st retest</td>
<td>.58</td>
<td>3</td>
<td>5.2</td>
</tr>
<tr>
<td>2nd retest</td>
<td>.37</td>
<td>1</td>
<td>2.7</td>
</tr>
<tr>
<td>3rd retest</td>
<td>.82</td>
<td>17</td>
<td>20.7</td>
</tr>
<tr>
<td>4th retest</td>
<td>.69</td>
<td>6</td>
<td>8.7</td>
</tr>
</tbody>
</table>

In this case the trouble was the holding of reactors, inattention to clean-up and disinfection, and the introduction of infected cattle.

17. Holding Reactors, Etc.

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Number Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>.86</td>
<td>16</td>
<td>18.6</td>
</tr>
<tr>
<td>1st retest</td>
<td>.38</td>
<td>5</td>
<td>13.2</td>
</tr>
<tr>
<td>2nd retest</td>
<td>.84</td>
<td>19</td>
<td>22.6</td>
</tr>
<tr>
<td>3rd retest</td>
<td>.69</td>
<td>1</td>
<td>1.4</td>
</tr>
</tbody>
</table>

This dairy herd is kept in a poorly lighted, poorly ventilated and very insanitary barn, which cannot be satisfactorily cleaned and disinfected without complete destruction of the building.
18. Insanitary Barn

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Number Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>22</td>
<td>9</td>
<td>40.9</td>
</tr>
<tr>
<td>1st retest</td>
<td>16</td>
<td>4</td>
<td>25.0</td>
</tr>
<tr>
<td>2nd retest</td>
<td>24</td>
<td>3</td>
<td>12.5</td>
</tr>
<tr>
<td>3rd retest</td>
<td>21</td>
<td>10</td>
<td>47.6</td>
</tr>
<tr>
<td>4th retest</td>
<td>33</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>5th retest</td>
<td>*17</td>
<td>0</td>
<td>.0</td>
</tr>
</tbody>
</table>

*Accredited.

Original test disclosed seven tankers. The third retest resulted in finding 10 reactors, only 1 of which was from original herd, 9 being additions recently purchased.

19. Inadequacy of Farm Quarantine

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Number Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>541</td>
<td>114</td>
<td>21.1</td>
</tr>
<tr>
<td>1st retest</td>
<td>541</td>
<td>127</td>
<td>23.5</td>
</tr>
<tr>
<td>2nd retest</td>
<td>541</td>
<td>137</td>
<td>25.3</td>
</tr>
<tr>
<td>3rd retest</td>
<td>315</td>
<td>66</td>
<td>21.0</td>
</tr>
</tbody>
</table>

This infection is probably caused by the owner maintaining some valuable reactors in quarantine on adjacent premises. The ordinary farm quarantine does not seem to be sufficiently thorough to prevent the spread of tuberculosis.

20. Poor Sanitation

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Number Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>110</td>
<td>16</td>
<td>14.5</td>
</tr>
<tr>
<td>1st retest</td>
<td>65</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td>2nd retest</td>
<td>47</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>3rd retest</td>
<td>127</td>
<td>9</td>
<td>7.1</td>
</tr>
<tr>
<td>4th retest</td>
<td>66</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>5th retest</td>
<td>104</td>
<td>21</td>
<td>20.2</td>
</tr>
</tbody>
</table>

This herd is maintained on the premises of an insane asylum, and sanitary conditions are very poor, the young animals being allowed to drink from seepage water contaminated by sewerage and drainage of the barns.

21. Subcutaneous Test Unsatisfactory

<table>
<thead>
<tr>
<th>Test</th>
<th>Number Cattle</th>
<th>Number Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>.60</td>
<td>13</td>
<td>21.7</td>
</tr>
<tr>
<td>1st retest</td>
<td>.31</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>2nd retest</td>
<td>.68</td>
<td>7</td>
<td>10.3</td>
</tr>
<tr>
<td>3rd retest</td>
<td>.64</td>
<td>4</td>
<td>6.3</td>
</tr>
<tr>
<td>4th retest</td>
<td>.47</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>5th retest</td>
<td>.98</td>
<td>24</td>
<td>24.5</td>
</tr>
<tr>
<td>6th retest</td>
<td>.71</td>
<td>3</td>
<td>4.2</td>
</tr>
<tr>
<td>7th retest</td>
<td>.69</td>
<td>0</td>
<td>.0</td>
</tr>
</tbody>
</table>
The subcutaneous method was less satisfactory in this herd than any that have come under our observation. Whenever attempts were made to apply a test it either had to be discontinued or a large number of cattle excluded on account of high preliminary temperatures. For this reason satisfactory progress could not be made. With the present use of the intradermic method progress is more satisfactory.

22. Failure to Detect Spreader

<table>
<thead>
<tr>
<th>Test</th>
<th>Number</th>
<th>Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>52</td>
<td>4</td>
<td>7.7</td>
</tr>
<tr>
<td>1st retest</td>
<td>48</td>
<td>12</td>
<td>25.0</td>
</tr>
<tr>
<td>2nd retest</td>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

A spreader in this herd was not detected on the original test.

CHART 4

Percentage of Infection in Cattle

You will observe on Chart 4 that the percentage of tuberculous cattle, found as a result of cooperative work, has been on the decrease since 1918. It is only fair to state that, if the work were confined to certain areas where infection exists extensively, the line would ascend. On the other hand, if the work was greatly extended in area where infection does not exist extensively, the line would descend. The work is being conducted both in the extensive areas and the comparatively free areas. The percentage on the chart, therefore, seems to be a fair criterion of the average amount of infection encountered.

CHART 5

Percentage of Infection in Calves

The question is frequently asked: Is it necessary to tuberculin test calves under six months of age? In the examination held for accredited veterinarians, numerous replies were made that it was not necessary to test calves under six months of age. But the information in Chart 5 shows that in infected herds, that is, herds where mature tuberculous animals are found, 3.1 per cent of the calves under six months of age are tuberculous. When you include calves from six months to one year of age, an average of 4.2 per cent is found. Therefore, it is considered very essential that all the calves be tested at the time the mature animals are tested.

CHART 6

Percentage of Infection in United States

Information on Chart 6 shows the percentage of infected premises as disclosed by tuberculin tests applied to herds from January 1, 1922, to October 1, 1923. This information covers the entire United States. The argument has been presented that it is a waste of time and funds to tuberculin test all the herds when but approximately 10 per cent of them are infected. You will observe from the mimeographed copies that the percentage of infected herds in some States is between 40 and 50. It would require more discerning power than the average person possesses to decide which herds should be tested because of the probability of their being infected and
which to omit from the testing because of the probability of being free. It is unnecessary to present any argument to an audience of this character to justify testing of all herds, especially when it can be accomplished with the facility and economy that exists today.

**CHART 7**

**Disposition of Reacting Cattle**

Chart 7 illustrates the disposition made of reacting cattle, and indicates that from January 1, 1922, to October 1, 1923, there were slaughtered under supervision 178,760 head of this class of cattle. Of this number 11.8 per cent were condemned as unfit for human consumption, while 1.4 per cent were passed for sterilization. This does not include the primal parts condemned, but refers to carcasses only. It will be noted that of all reactors slaughtered, 88.2 per cent were passed in whole, or part, for food. Frequent inquiry is made of inspectors engaged in tuberculosis work relative to the percentage of animals having udder infection, because of the important bearing it has on the health of the public. It will be noted that 0.6 per cent of all reactors slaughtered disclosed udder infection.

It has only been in recent years that much attention has been given to the inspection of the hides of reactors. The chart shows that 3.1 per cent of reactors slaughtered disclosed skin lesions of tuberculosis only. A great deal of discussion has taken place relative to obscure lesions. You will note that the chart indicates 0.8 per cent of all reactors slaughtered so classed. The notation below refers to a number of locations where tuberculosis is usually not found, and would usually be overlooked unless a very careful post mortem examination is made.

Information from which this chart is compiled is submitted to the Bureau monthly from its various stations throughout the United States.

**CHART 8**

**Growth of Accredited-Herd Work**

Chart 8 indicates the growth of accredited-herd work commencing with 1918, in which year 204 herds were accredited. In 1919, 782 herds were fully accredited, and in 1920, 3,370 herds were granted an accredited certificate. In 1921 8,201 herds were issued certificates. In 1922, this work continued to grow rapidly, although the area movement became very popular and was encouraged in many of the States. Up to October 1, 1923, 32,242 herds were accredited. It will be noted that 649,096 cattle in the United States were accredited on October 15, 1923.

The information from which this report was compiled was forwarded to the Bureau from the various tuberculosis stations.

**CHART 9**

**Delayed Reactions in Infected Herds Following the Intradermic Injection at the 96th and 120-150th Hours**

There are delayed reactions to the intradermic tuberculin test the same as have been observed in the subcutaneous and ophthalmic. When the delayed reactions assume a degree of importance, it is necessary to make our observations in accordance. It was found several years ago that the
percentage of delayed reactions to the subcutaneous test was so infrequent that it was impracticable to read temperatures later than the 18th hour. Chart 9 shows 0.8 per cent of additional reactors to the intradermic test at the 96th hour to those found at the 72nd hour, and 0.4 per cent more reactors at the 120-150th hours that were not reactors at the 72nd or 96th hour. It will also be observed that if the 72nd hour observation was omitted, and the observation made at the 96th hour instead, there would be lost 1.1 per cent of reactors visible at the 72nd hour not visible at the 96th hour.

This association went on record in advocacy of a second reading of the intradermic test in infected herds.

CHART 10
Testing by Accredited Veterinarians in Connection With Cooperative Tuberculosis Eradication Work

Chart 10 indicates the number of cattle tuberculin tested by accredited veterinarians since July 1, 1921. This covers cattle tested by these vets in connection with the retesting of accredited herds, additions to herds and original tests made under paragraph 6 of the accredited-herd plan. It does not include the testing done by these men when they are employed by States, counties or other organizations, but covers the cases where the expense of the test was paid by the owners of the cattle tested.

The amount of this work reported seems to be increasing, and from present indications will reach 300,000 cattle during the fiscal year ending June 30, 1924, or three times the 100,000 cattle during the fiscal year ending June 30, 1922, or two times the number so tested in the year ending June 30, 1923.

CHART 11
The Area Plan of Tuberculosis Eradication

Chart 11 indicates that all the cattle in 98 counties have been tuberculin tested and that 17 of them have met the necessary requirements so that they are classed as “Modified Accredited Areas.” Arrangements will be made to place others in such classification within a short time. Intensive work is being conducted in 207 more counties at this time, with a view of tuberculin testing all the cattle in them. The above mentioned counties are located in 21 different States. In addition to the above, there are many other localities where the intensive work is going on, but it is confined to townships or other units, and not on a county-wide basis.

In the 305 counties where all the cattle have been tuberculin tested, or are being tested, there are, approximately, 8,000,000 cattle, or nearly one-twelfth of the cattle in the United States. If all the areas other than counties were included, the number of cattle in localities operating under the area plan would easily amount to 12 per cent of the cattle population of this country.

There are many more counties where arrangements are being made to take up area work. Various means of raising funds locally for use in cooperating with the States and Federal Government are in operation, but the most satisfactory method is by appropriations from county boards when same is authorized by the State laws. It is important that public sentiment
be favorable to the plan, and it is customary in many States to obtain signed petitions calling for the work. Another satisfactory plan is to hold an election in a county so that the people may express themselves for or against the project. It is necessary to have rules and regulations governing the movement of cattle into areas where the plan is in progress or completed.

CHART 12
Indemnity for Tuberculous Cattle

Owners of tuberculous cattle that are slaughtered are partially reimbursed for same in all States except Alabama, Arkansas, Georgia, Louisiana and California.

Chart 12 indicates the averages for the last four years. There has been considerable reduction in the average appraisal, due, of course, to some extent to the decrease in cattle values. This is also caused by a reduction in the limitation of appraisals in some States, and also to better judgment on the part of the appraisers.

The amount of salvage shown is the net return to the owners of the cattle. Every effort is being made to make the return as large as possible. The amount of State indemnity per animal has been reduced a great deal in the last four years, and this is largely due to limitation placed on the amount that a State can pay.

The maximum amount of Federal indemnity per animal has been the same since the law providing for same was enacted, namely, $50 for pure-breds and $25 for grades. The reduction in the average amount of Federal indemnity during the last four years has been partly due to the decreased value of cattle, and also to the State limitation which has been reduced, and to better judgment in appraisals.

Another sheet gives the indemnity averages in the various States for the fiscal year 1923.

President Butler: You have listened to an address that it was well worth coming thousands of miles to hear. Dr. Kiernan and his co-workers deserve the thanks of this organization for the manner in which they have gathered together this data on bovine tuberculosis eradication work.

The next paper on the program is "Salvage for the Reactors from the Standpoint of the Packer and Owner" by Mr. Everett C. Brown, President of the National Live Stock Exchange, Chicago, Ill.

SALVAGE OF REACTORS FROM THE STANDPOINT OF THE PACKERS AND THE OWNERS

EVERETT C. BROWN,
National Live Stock Exchange.

Gentlemen of the Conference:

The live stock industry of the United States has been and still is imperiled by the prevalence of bovine tuberculosis. I have kept in close touch with the situation relative to this menace to our industry for a number of years and I am convinced that the activities of the federal and state governments cooperating with other live stock organizations such as the
Live Stock Exchanges, which I represent are striving to eliminate the most dangerous disease that exists either in the bovine, porcine, avian or human families. I have been asked by Mr. Jacob, the chairman of the Committee on Tuberculosis of your organization, to discuss the question of the “Salvage of Reactors From the Standpoint of the Packers and the Owners.” Since my time is limited to twenty minutes, I shall endeavor to confine my remarks within such a period.

It is my belief that one of the most important problems in the bovine tuberculosis eradication program is the securing of a high salvage price for reactor cattle which have passed for food under federal inspection. At the inception, and during the first two or three years of the tuberculosis eradication campaign, the problem of securing salvage was only of mediocre importance. The work, as you all know, was transgressing through its experimental stage. The big problem was that of presenting the matter to the American public in such a way that its merit could be most easily visualized. I have heard arguments presented in support of the idea that reactor cattle are diseased animals and, therefore, have little value. In so far as reactor cattle, while still on the hoof, are concerned, I believe such a statement is true. It is an obvious fact that a diseased animal will not produce one hundred per cent efficiently. In addition to this fact, a tubercular animal may infect many others in an individual herd and other herds as well. The still greater necessity for removing these diseased animals is the danger which they maintain to the health of the human family.

Frequent visits to the killing floor of the Chicago Packing Plant to inspect that activity of the Chicago Live Stock Exchange which concerns the disposition of reactors has served to most forcibly impress me with the fact that some of those animals which I have seen abounding with pus formations probably only twenty-four hours before produced milk for the little children of Chicago and elsewhere.

It is my contention that the eradication of tuberculosis should be conducted along lines of consistency such as are followed by the Bureau of Animal Industry of the United States and which do not give exaggerated importance to the opiate of pasteurization. Pasteurization, although a fortunate cleanser of milk, will not eradicate tuberculosis among live stock. If we can educate the country thoroughly of the fact that a tubercular animal is an economic liability and not in any sense an asset while alive, and that that same animal may be of some intrinsic value when it has been killed, I believe we will have a large measure accomplished our purpose. The killing of a reactor places him out of the way, stimulates the production of clean cattle, and makes room for a valuable animal in the herd of higher efficiency.

I remember very clearly that when a committee of the Chicago Live Stock Exchange a few years ago, after a study of available figures and statistics and obtaining a “bird's-eye view” of the situation, secured the cooperation of the packers and instituted in our organization a new Department, which was called the Sanitary Department. Our Sanitary Committees and Live Stock Commissioners of our Exchanges have always endeavored to work in harmony and cooperation with the Federal and State
authorities to help in the constructive formulation and evolution of the bovine tuberculosis eradication program. At the time the Exchange first placed in the field a Sanitary personnel, there was no indemnity for reimbursing herd owners and there was no system of handling reactors other than selling them for what little they would bring on the market. At that time as now there was a decided stigma on cattle that were classed as tubercular. After the educational campaign began to bring more and more reactors to the Chicago Market, the Exchange devised a system of handling them by a contract with the State Department of Agriculture and one of the local packers whereby the cattle were killed through the medium of the Exchange and under the supervision of the slaughter-house committee and sold on the hooks to the highest bidder.

During the year 1918 the Chicago Live Stock Exchange slaughtered a total of eight hundred reactors. During the year 1920, 6,178, and during the year 1921, 11,380 reactors were killed. In 1922, 20,030 were killed and a representative week for 1923 is from one thousand to fifteen hundred reactors. It is patent that this rapid increase in the number of reactor cattle slaughtered at the Chicago Market is indicative of the rapid extension of the work of testing herds throughout the country and the increasing number of communities that desire to take advantage of the county area method of systematic testing.

At a meeting day before yesterday at the Saddle and Sirloin Club, which was attended by the members of our Sanitary Committee and the heads of the Beef Departments of the larger packers, together with Doctors Mohler and Kiernan of the Bureau of Animal Industry, acting in an advisory capacity, the situation was discussed at length. I believe that in a short time we will be able to work out a system of taking care of this branch of the industry which will greatly facilitate the more economical disposition of reactors on the Chicago Market.

A year ago, before the recent large appropriations for indemnity money were available no one anticipated such a congestion of reactors as are now found on the Chicago Market. These large numbers of dairy cattle and similar stock of low dressing percentage injected into the receipts, has proven a decided factor in lowering the value of the same class of stuff on the open market.

The Live Stock Exchanges, which represent the producers of the United States on the open markets, are constantly studying the needs of their customers, the live stock producers. By virtue of our central location and consequent ability to study the producers' problems from the angle of a connoisseur in the industry, we naturally are in accord with him in his anxiety to secure a higher salvage for reactor cattle. We realize the fact that the producer, when submitting his herd to the Federal and State authorities to be tested for tuberculosis, is taking a chance of an immediate loss, but is working for the benefit of the industry in the elimination of its most virulent menace. In some of the northern dairy districts the percentage of tuberculosis is appalling. This means owners of cattle in this section particularly must, if they remain in business, receive a liberal pecuniary reimbursement to withstand the shock of losing large portions of their herds. In addition there is the further necessity of conserving the
indemnity funds. A low salvage received for reactors on the markets will drain from the funds available to pay indemnity, large sums of money. Such a limitation placed on the work will cause the total number of cattle tested to be curtailed by thousands and will hinder the work in proportion. The problem of the packer is somewhat of a parallel to the problem of the producer, even though the producer is the seller and the packer the buyer. Both are intensely interested in the welfare of the industry. The packer must guard against handling these diseased cattle at a loss, but in order to stimulate testing and fulfill his obligations in the campaign he must pay the highest price possible.

I believe the packer realized that his attitude must be a philanthropic one in the matter and will endeavor to dispose of this class of cattle to the best advantage of the eradication of tuberculosis. You are, no doubt, familiar with the other methods of handling reactors that are employed at the various markets apart from the one I have hurriedly described as the system used in Chicago. At some of the markets the packers buy subject to test. At others they buy the tagged animals and take their own chances on condeminations.

There is a question in my mind as to which system is best at a market where there is a very large number of reactors. It may be that experiment will teach us in the future that a division of reactors among the various packing plants will suffice to bring about keen competition.

The Chicago Live Stock Exchange is constantly experimenting with this problem of handling reactors. We believe that in a short time we will be able to report an improvement in disposing of reactors and will be ready for the big increase in this class of cattle which we expect for next year.

The next paper on the program is "The Inter-Relation of Human and Bovine Tuberculosis" by Dr. M. P. Revenel, Professor of Medical Bacteriology and Preventive Medicine, University of Missouri. Director of Public Health Laboratories, Columbia, Missouri. We of the veterinary profession consider that there are very few men in this world who are better able to address us on this subject than Dr. Revenel. Those of us that have had the pleasure of having previously listened to Dr. Revenel know that we are in for a treat, and that his address will be brimful of facts that cannot be successfully refuted. I take great pleasure in introducing Dr. M. P. Revenel.

NOTE—Dr. Revenel has agreed to prepare a synopsis of his address, which will be issued to members in pamphlet form at a later date.

The next paper on the program is "Suggestions for Private Practitioners Conducting Tuberculin Tests Under the Accredited Herd Plan," by Dr. C. H. Case, Akron, O.

President Butler: I am sure that each and every one of us should read and re-read Dr. Case's paper. If we will only live up to the plan which he has outlined I know that many misunderstandings would be washed away, and that the veterinary profession would be placed upon a higher standard.
SUGGESTIONS FOR PRIVATE PRACTITIONERS CONDUCTING TUBERCULIN TESTS UNDER THE ACCREDITED HERD PLAN

Dr. C. H. Case, Akron, Ohio

This is a subject which is very vital to the private practitioner and accredited testing will continue to increase during the next few years, past the expectations of our most loyal adherents to the tests.

You will note that this paper is entitled "Suggestions," so please treat it accordingly with an open mind.

The private practitioner, in the past, with few laws regulating the testing of cattle, was somewhat disturbed when the State and Federal Veterinarians came into his practice and tested for the accredited herd plan, the best herds, the very ones that meant part of his living. Today it is just reversed and the increase in testing of accredited herds, plus the cattle bought to enter accredited herds, has increased the income of the private practitioner past all expectations and we are of the opinion that in the next few years the practitioner who has been bemoaning his fate that he had no business will be clamoring that he has too much and wondering where he can get a recent graduate to assist him.

There is one thing certain, that if the accredited veterinarian does not do his work and do it well and at a reasonable cost there will be other means found whereby the accrediting testing can be done.

Just remember what has been done to the practitioner who treated hogs. Let us take warning and meet the issue squarely and then the accredited Veterinarian will be praised in years to come for his part in reducing the suffering to humanity and eradicating tuberculosis in cattle from the United States so that our boys and girls, yours and mine, may drink milk without fear of tuberculosis.

In Ohio there has been a method adopted for the accredited Veterinarian to follow that I wish to read at this time.

You will note that the owner of an accredited herd has the privilege of choosing any Veterinarian whom he wishes to test his herd, and then the State and Federal office send you authorization to conduct the test at a given time and designate the method to be used, at the same time sending the tuberculin.

Every accredited Veterinarian should provide himself with a good intradermal syringe and a good supply of needles. Also an eye dropper, so that the ophthalmic test can be conducted correctly. To make a correct test the intradermal tuberculin must be put in the proper place by a sterilized syringe and the skin made as clean as it is possible.

Be sure that the eye tuberculin is put under the eyelid. It has been our practice for some time to carry a complete outfit already sterilized and ready for use in our medicine bag and we have tested many head of cattle that we perhaps would not have tested if we had not been prepared, and likewise save ourselves an extra trip and the owner less expense.

Do not give intradermal injections with a dirty syringe. You will have fewer no-lesion post-mortem examinations to explain.

I have been told by authorities that a few accredited Veterinarians
have not provided themselves with the proper syringe. You cannot do proper work unless you have the proper instrument. Live up to the title, Accredited Veterinarian.

A few months ago we were called upon to settle a controversy whether a certain heifer was supposed to react to the intradermal test and upon examination of the area found it covered with dried blood. Upon questioning we were informed that the heifer could not be made to stand quiet and that three punctures had been made with a very large needle which had been made to give subcutaneous injection.

Is there any wonder that the owner was dissatisfied?

Every accredited Veterinarian should own and carry at all times a bull leader. It is just as important as a syringe for if the animal is not under control so that the injection can be made properly, there is great danger of making a mistake in your reading at the 72nd hour.

A branding iron should also be carried, and the proper tags. In Ohio the Veterinarian buys his own tags through a firm which makes them for the State, and a record is kept of tags supplied to each Veterinarian.

Every accredited Veterinarian should report all tests promptly or within five days, according to a ruling in our State. If the reactor has been tagged and branded, it removes any chance of which the unscrupulous dealer might wish to avail himself.

When the owner of an accredited herd places his confidence in you to have his herd tested, remember that you will have to answer for his herd not only this time, but in years to come. As an accredited Veterinarian he looks to you to keep his herd clean. You are in a different position from the State and Federal Veterinarian, who is here today and gone tomorrow. If he gets a reactor he is not there to face the music that follows. Not so with the accredited Veterinarian. He must use every means possible to keep everyone satisfied. When one of our clients requests us to conduct a test on his accredited herd we explain that we can conduct his test by the intradermal test only, but would prefer to use a combination of the intradermal and ophthalmic tests, so that we can be more positive that his herd is free from tuberculosis.

We have adopted the plan of instilling the sensitizing tuberculin from 7-14 days prior to the injection of the intradermal tuberculin and when we read the intradermal, instill the diagnostic tuberculin and watch for the eye reaction from the 4th to the 8th hour thereafter. It is very important to be on hand to watch for the eye reaction from the 4th to the 8th hour, which will be quite pronounced if the above method is followed. Some will react at the 4th hour and if observed at the 6th hour would be almost negative, and some do not show reaction until the 8th hour. We know if we had not been on the job watching at the 4th hour we would have missed quite a number of reactors.

Another important point of sensitizing 7-14 days prior to the intradermal injection is that we have often 4-8 hours after the intradermal injection an ophthalmic reaction, although no tuberculin had been instilled in the eye for over 7 days; the owner making such reports.

By following this method we have had to remove two accredited herds,
one of 30 and one of 58 head, in the past six months. In one herd, one cow reacted to the ophthalmic test only and upon slaughter showed several abscesses in her lungs and was a very dangerous cow to be in the herd and more trouble is feared at a subsequent test. In the other herd two cows reacted to the ophthalmic test, one of which also showed a suspicious reaction to the intradermal. Both upon slaughter showed lesions, one skin lesions, the other mesenteric.

For the above reasons we would suggest wherever it is possible that accredited Veterinarians apply the ophthalmic test in combination with the intradermal test. You will be well repaid for the time expended.

The extra time spent watching the ophthalmic test gives you a good chance to get acquainted with your client and you likewise can tell him what other sections are doing to free herds of tuberculosis and also some of the good things published in “Sidelights on Tuberculosis Eradication,” which every accredited Veterinarian should read so that he can be prepared at all times to talk on tuberculosis.

The report of the herd of the Methodist Orphans’ Home in North Carolina and the test of the 150 children with 90% reactions has been the means of causing many of our clients to have their herds tested.

The accredited Veterinarian should be on hand when every reacting cow is slaughtered and should insist on the owner being present, for once he sees the condition of the animal he is forever a booster for the tuberculin test.

We have an owner of a large herd of cattle who denounced the tuberculin test as a graft and ridiculed the test as far as the danger of children was concerned when we requested him to test his herd along with his neighbors. He consented later to witness the post-mortem examination of about 331 of his neighbor’s cattle and about one month later he bought a cow from an accredited herd, telling the owner that we had told him of the danger to children drinking milk of unknown source and since seeing the tuberculous cattle killed he and his wife had decided to have one cow known to be free from tuberculosis so that their four small children could have clean milk. They sent 80 gallons daily to the city children to drink.

Now, the greatest problem that the accredited Veterinarian must solve is the charge to be made for testing. Put yourself in your clients’ position. You know how much he is making from his milk. He is not getting a great deal, I can assure you. If an excessive charge is made he is going to try to get someone to do his testing as low as possible the next time or he may drop from the accredited list entirely. It is up to the accredited Veterinarian to be fair to the dairyman and make a moderate charge if he wishes to continue the testing of the accredited herds.

The future of the accredited Veterinarian is unlimited, as we view it today, if a fair price for his work can be maintained.

Different sized herds, methods of testing used and distance traveled make the necessity for different charges. We have adopted the following charges which we think are fair to the client as well as to ourselves:

Where we apply the intradermal and ophthalmic tests on herds of 75-100 or more we charge at the rate of 50c per head; from 25 to 75, 75c
per head; under 25 head, $1.00 per head. Where only a few cattle, as 3 to 10 head, are to be tested we charge by the trip, i. e., if the client lives out 5 miles and our usual charge is $3.00, the 3 trips necessary to make the test would make a charge of $9.00. The small herd owner is very well satisfied with such a charge.

To encourage the owner of one cow to use milk from a cow free from tuberculosis we test such cows in or about the city limits for $5.00. We also test one cow at the Hospital by the subcutaneous method for $5.00, including hospital care.

In defense of the above charge we want to state that the expense to the State of Ohio was 96c per head last year, to test cattle for the accredited herd plan by the intradermal and ophthalmic methods, and this included salaries and expense of traveling only.

Further, in past years when the subcutaneous method was used the expense was from $1.07 to $1.50 per head.

Further, Veterinarians were assigned to one or more counties during the last year, which lessened the amount of travel. Since August 1st, 1923, Ohio has been doing area work with the intradermal test only, the owner of cattle standing the expense of transportation with the result that the cost has been reduced to 30c per head. As soon as the time comes when the accredited Veterinarian can test several herds at one time the cost can be reduced to below 50c per head, but the cost alone is not all that there is to be considered. A clean herd should be uppermost in every accredited Veterinarian’s mind and the charge will take care of itself.

In the county where we are located there are 20,000 head of cattle. We hope to have them all in modified accredited area soon. There are 5 accredited Veterinarians in the county. It does not take much foresight to see what additional revenue we will receive when once the entire county is accredited, even figuring at 30c per head it would be $6,000.

While in conversation with several Veterinarians this fall a recent graduate who had passed the accredited Veterinarians’ examination said he had a client who lived 5 miles in the country, who had a herd of 5 accredited cows which he had been requested to test and he asked if $25 would be a fair price for the intradermal test. He was asked how many cattle he had tested and he replied “not any, but he had observed one herd tested while in school.”

A state assistant Veterinarian assisted with the test later, and I have been thinking ever since if some requirement, such as to have made 200 tuberculin tests in company with a State, Federal or accredited Veterinarian should not be required before the examination could be taken to become an accredited Veterinarian.

In recent years we have heard much about the County Agent, especially along the lines of hog cholera work. Now that the area eradication is increasing at such rapid strides the County Agent is a great factor in assisting to get the different townships and counties signed up for the tuberculin test.

We know of two who have done almost the entire work themselves, while the accredited Veterinarians have not assisted to any extent, yet
later expect to benefit by the work done by the County Agent, the State and the Federal Government, who turn the herds over to the accredited Veterinarian who has not expended any effort, and by the arrangement in Ohio the owner must even request him to do the testing.

The accredited Veterinarian should by all means be the pioneer worker in the modified accredited area eradication. Go to your County Agent and get his support. He can help you in many ways, as he is in close touch with the farmers' activities.

If the accredited Veterinarian expects to stand back and let the farmer and County Agent do the organizing work, the State and Federal Department do the actual work, he will wake up some day when it is too late and see someone else doing the work he should be doing.

Now for a few suggestions. We have found some means whereby an accredited Veterinarian can help with area tuberculin testing.

Become an associate member of your local Medical Society and get their assistance to solve your problems. They have been of great help to us by advising their clients to use milk from tuberculin tested cattle.

When making calls upon your dairy herds tell the owner of what is being done by the State and Federal Government in your state and elsewhere. In cooperation with your County Agent give talks at the different township meetings. We have also been asked to talk at our Milk Producers' Association Meeting, or where a few interested farmers have gotten together in one of their homes. For instance, the Southern Branch of the Summit County Milk Producers' Association met in the schoolhouse at East Liberty, November 24th, 1923. A motion was carried that the Association make an effort to get Green Township signed up 100% for the purpose of eradicating bovine tuberculosis.

Get your Chamber of Commerce interested, especially the Health Committee. We have found them to be more helpful than any other organization. We began by taking the Secretary of the Chamber of Commerce and other members with us when we killed tuberculous cattle. They saw the different stages and the condemned carcasses that went to the tank. Without exception these men demanded milk from cows that were free from tuberculosis and got it.

Through the Chamber of Commerce a resolution asking for a larger appropriation was sent to the Governor, Commissioner of Agriculture, to every Senator and Representative, and to every Chamber of Commerce in Ohio. At the time of the last session of the Legislature $300,000 was appropriated instead of $100,000, as in the past 2 years. This last August when area testing started in Ohio the Chamber of Commerce sent out articles to all the newspapers urging the cattle owners to enter the area eradication. Through them we induced the County Commissioners to give 25c a head toward the expense of testing all the cattle in our County. Then 4 different milk companies were induced to give an additional 25c for every cow tested, that furnished that particular company milk, which makes a total of 50c. We now have half the County signing petitions. Some townships are already 100% and we hope soon to have the entire County signed up and all cattle tested in the near future.
Newspaper publicity on each petition returned interests other townships to take out petitions, and a few who have been missed have come in to sign up.

Another way that an accredited Veterinarian can place this matter before the public is to give a demonstration of tubercular specimens at the County Fair. We procured two showcases with glass covers, from the State Veterinarian’s Office, and tuberculous lungs, ribs with tuberculous growths and tuberculous pig glands from the packing houses. The County Agricultural Society reserved a stall in the cattle barn for the display. The specimens were kept in a 5% solution of formalin, only enough being put in to cover the bottom. As a makeshift, a white porcelain baby bath-tub, covered by a glass, was used the first day instead of the special display pans, which were late in arriving. Four very busy days were spent talking tuberculosis eradication, and giving out tuberculosis primers. It was very gratifying to have the owners of tested herds come and see the display and tell how glad they were that their herds were tested. Many returned with their neighbors to induce them to test also. We found out that the boys and girls of 12 to 18 years of age knew more about tuberculosis than many of their parents. On many occasions they brought their parents to see the exhibit and told of what they had been taught in school.

We were rather shocked at the county butcher, who informed us that it was not much of a trick to remove the tuberculous growths from the ribs and sell the carcass, especially as Akron has no meat inspection. Any one, or a group of accredited Veterinarians, can put on such a display at the County Fair and will be amply repaid for the time spent.

The accredited Veterinarian should cooperate with the State and Federal Government in every way possible, especially when they are testing in your county. We can be of great assistance planning the different routes to be followed and even in offering transportation to the various herds to be tested.

The State and Federal veterinarians cooperating with the accredited Veterinarians can soon make the dream of a tuberculosis-free United States come true.

Let every accredited Veterinarian go home from this meeting resolved that during the next year and the years to come, he will assist the State and the Government in every way in his power, so that the eradication of bovine tuberculosis by the area plan may be the great success it deserves to be.

C. H. CASE, Akron, Ohio.

The next paper on the program is “Agencies Through Which Bovine Tuberculosis Is Disseminated,” by Dr. E. C. Schroeder, Superintendent of Experimental Station, U. S. Bureau of Animal Industry, Bethesda, Md. Dr. Schroeder holds an unique place in the hearts of the Veterinary profession. His work has enlightened us on many subjects. His addresses are always concise and to the point, and based upon experimental and investigational data of the highest order.
AGENCIES THROUGH WHICH BOVINE TUBERCULOSIS IS DISSEMINATED

By E. C. Schroeder, Bethesda, Md.

The subject of my paper is old; it has been discussed repeatedly and thoroughly, and I fear it will be difficult to say anything original on it. But it is a superlatively important subject which requires repeated and exhaustive discussion, and the chairman of this section is to be commended for assigning it to someone, though I almost wish that I had not been the someone he selected.

Tuberculosis is caused by an obligatory micro parasite, the tubercle bacillus. In nature this parasite multiplies nowhere but in the bodies of living hosts, and its perpetuation depends entirely upon its multiplication in and its escape or expulsion from the bodies of its present hosts and its entrance into the bodies of future hosts. The life-history of the parasite, as far as we know it, is quite simple, and requires only a single host for all its phases. Hence, tuberculosis is a true contact disease, and spreads in one way only, namely, contact, either immediate or mediate, between its actual and its possible victims.

That immediate contact between tuberculous and healthy cattle is a perfect agency for the dissemination or propagation of bovine tuberculosis is so self-evident that it requires no argument. But, whether immediate contact with other subjects of bovine tuberculosis than cattle is an agency through which the disease perpetuates itself, is another and rather an important question, because the bovine tubercle bacillus has the power to attack and cause tuberculosis lesions in many different species of animals, being, in this respect, the most potent and most virulent of the several recognized types of the bacillus.

For example, children, next to cattle and hogs, are the commonest victims of bovine tuberculosis. The lesions of bovine tuberculosis in the bodies of children in most cases have a character and a location not compatible with the dangerous expulsion of tubercle bacilli. Hence, the spread of bovine tuberculosis from children to children, or from children to cattle and other species of lower animals, is so rare, if it occurs at all, that it certainly is of negligible importance.

Of children we may say, though they serve as hosts for the micro parasite of bovine tuberculosis, they are not satisfactory or sufficient hosts for the perpetuation of the parasite, which, if it could find no better hosts, would be doomed to early extinction.

The host-parasite relationship between bovine tubercle bacilli and other species of animals than cattle, while it may not be improperly balanced for the perpetuation of the parasite in the same way as in children, nevertheless, as far as I have been able to secure data on the subject, would lead to the same results, the fairly rapid extermination of the parasite, and here the occurrence of tuberculosis among hogs serves as an example.

Hogs exposed to tuberculosis cattle contract tuberculosis more quickly than similarly exposed cattle, but healthy hogs exposed to tuberculous hogs contract the disease so slowly that it would die out in a herd of hogs in a few years unless fresh infectious material from cattle was supplied to keep it alive.
Whether tuberculosis spreads from tuberculous hogs to cattle has not been conclusively determined. An experiment to answer this question, which derives its importance from the great and seemingly increasing frequency of tuberculosis among hogs, is now in progress at the Experiment Station of the U. S. Bureau of Animal Industry.

It is difficult to say in what measure the incidental and occasional hosts of bovine tubercle bacilli, hogs, horses, goats, cats, dogs, etc., serve as agents for the dissemination of bovine tuberculosis, and this is well illustrated by events like the following:

A number of years ago I found that mice, after having eaten a few grains of tuberculous tissue from a guinea pig affected with bovine tuberculosis, expelled tubercle bacilli for a few days with discharges from their bowels. Then an interval of time elapsed during which the expulsion of tubercle bacilli did not occur, and this in turn was followed by quite a long period of time during which the mice seemed to be in good health, but regularly discharged tubercle bacilli via their bowels. When such mice were killed or died, from six months to a year after they had been fed the tuberculous tissue, which they consumed as though it were a delicacy, they often showed white patches in their lungs, varying in size from points to an eighth of an inch in diameter, and smear preparations from these patches microscopically had the appearance as though they had been made from pure cultures of the tubercle bacillus. Mice of this kind, fed to hogs, infected them with tuberculosis; in several instances a single mouse proved sufficient for the infection of a hog.

At this stage of the investigation I might have concluded that mice are first class agents for the dissemination of bovine tuberculosis, but I refrained from doing so because I realized, if this conclusion was true, I would be forced to conclude that it was very remarkable that the Experiment Station, on a few acres of ground, had been able to maintain several groups of tuberculous cattle and a larger number of groups free from tuberculosis, year after year, without the spread of the disease from the former to the latter.

Consequently, I did several things. I examined many mice caught in the environment of tuberculous cattle. I have yet to find the first of which I can say that it harbored tubercle bacilli. I arranged specially constructed cages and run-ways to secure exposure through mice of healthy to tuberculous cattle. The results were wholly negative. I embedded infected mice in bins of corn meal from which several cattle were fed. The mice disintegrated, disappeared and the cattle remained free from tuberculosis. It was quite an elaborate experiment, which thus far has had the ill fate of many experiments with negative results, in that it has never been written and published in detail.

The conclusion I believe we should draw here is, while it is not clear whether the incidental or occasional, or, more properly, the non-specific or foreign hosts of bovine tubercle bacilli serve as agents for the dissemination of bovine tuberculosis, it is wise not to take the questionable chance of introducing tuberculosis into clean or cleaned herds through the agency of animals of any species that have been intimately in contact with tuberculous cattle.
The two agencies for the dissemination of bovine tuberculosis of which I have spoken, immediate contact with tuberculous cattle and immediate contact with foreign hosts of the tubercle bacillus, have one thing in common which mediate exposure lacks. Both are exposure to agents in which tubercle bacilli multiply and increase in numbers.

Mediate exposure is concerned only with tubercle bacilli after their separation from the body of the host in which they grew, and which do not multiply until they have reached another host, though they remain alive, dependent upon the conditions to which they are subjected, varying periods of time.

Tubercle bacilli are expelled by tuberculous cattle, in accordance with the character and the location of the lesions, through the mouth, nose, rectum, vagina and udder. The commonest mode of expulsion is with the feces via the rectum. There is no mystery about the great frequency with which feces of tuberculous cattle contain tubercle bacilli. The bacilli get into the bowels in a simple and easily understandable way. They are coughed up, swallowed and pass through and out of the intestinal canal. As in man, pulmonary tuberculosis is the commonest form of the disease in cattle. Cattle cough, but do not spit, and a very small, open lesion of tuberculosis in the lungs is sufficient to cause the presence of tubercle bacilli in the discharges from the bowels. Or, as one investigator, who had repeated the original work of the Experiment Station on this subject, informed me, "The small size of the lesion in the lung that is sufficient to determinably infect the feces of a cow with tubercle bacilli is surprising."

At the Experiment Station it was proved that tubercle bacilli fed a cow can be recovered from her feces and shown neither to have lost their virulence nor to have changed their character.

From the udder tubercle bacilli are expelled when it is diseased, and the udder may contain tuberculous lesions long before they can be detected by a physical examination. I recall one case of udder tuberculosis from which the milk invariably caused tuberculosis in the guinea pigs into which it was injected months before physical examinations of the most careful kind revealed anything abnormal. The udder in this case eventually showed abundant tuberculous lesions. It is asserted that tuberculous cows with healthy udders may expel tubercle bacilli with their milk. Whether this is true or not I am unable to say. Personally I have tested the milk of many tuberculous cows for tubercle bacilli; some of the cows were advanced cases of tuberculosis with widespread, active lesions, but I have yet to find a cow of which I can say that she expelled tubercle bacilli through an unaffected udder. My experience may be unusual, though it should be remembered that the presence of tubercle bacilli in milk is by no means dependent upon the tubercle bacilli it contains before it leaves the udder. One of the commonest contaminations in market milk is cow feces, and the frequency with which the feces of tuberculous cows contain tubercle bacilli would account for a quite frequent presence of tubercle bacilli in the milk of tuberculous dairy herds.

Tubercle bacilli are present in the urine and discharges from the vagina when any portion of the genito-urinary organs is affected by tuberculosis.
Cattle often discharge tubercle bacilli from their bodies long before they show symptoms of tuberculosis or sickness of any kind, and this fact would make it impossible to control or eradicate bovine tuberculosis without the aid of the tuberculin test, or some equally good, but as yet undiscovered, means to distinguish between tuberculous and healthy cattle. Before the discovery of tuberculin the commonest and most effective agency for the dissemination of bovine tuberculosis was the unsuspected, the unrecognized and unrecognizable, apparently healthy, tuberculous cow.

We sometimes hear tuberculin condemned because it is not absolutely perfect in the results it gives us, and one of the commonest criticisms to which it has been subjected is that some cattle react with tuberculin and afterwards, on slaughter, fail to show lesions of tuberculosis.

As I am convinced that every cow affected with tuberculosis should be looked upon as an actual or potential disseminator of tubercle bacilli, the criticism that can be directed against tuberculin on the basis of so-called, "No-lesion reactors" should be given much less weight than any criticism based on the failure of tuberculin to show a reaction in the presence of other cases of tuberculosis than those that are sufficiently advanced to be detected on ante-mortem physical examination.

No lesion reactors can be divided, as I have concluded from the attention I had given them, into several groups.

1. Cattle in which no lesions are found in the short time that can be devoted to a post-mortem examination at a slaughter house, but in which lesions would be revealed by a more searching examination.

2. Cattle in which no microscopic lesions, or lesions visible to the naked eye, are found, but in which bacteriological tests reveal the presence of virulent tubercle bacilli.

3. Cattle in which nothing is found to account for their reaction with tuberculin.

The proportion of so-called no-lesion reactors that belongs in the first and second groups is indicated, not definitely shown, by the results obtained in the Division of Pathology of the U. S. Bureau of Animal Industry through the study of material from more than 4,000 cattle that had reacted with tuberculin and in which the autopsy failed to reveal lesions of tuberculosis. The material studied in no case was the whole animal, but only such small portions of the animal which the veterinary inspector who made the post-mortem examination at the place of slaughter had been instructed to collect and forward to the Division of Pathology from reacting cattle in which he could find no lesions.

It was proved, absolutely and irrefutably, that 222 out of every thousand of the animals from which material was studied were infected with living, virulent tubercle bacilli. How much greater the proportion proved to be infected among these so-called no-lesion tuberculin reacting cattle would have been if their entire bodies had been given the searching examination to which the small portions forwarded to the Division of Pathology were subjected, is a question which must take into account that tuberculosis may attack any part of the body and that isolated tuberculous lesions in unusual parts are apt to be overlooked.
Only a short time ago a searching post-mortem examination, made at the Experiment Station, of a heifer that had served in an experiment made to determine whether tubercle bacilli can enter the body through the conjunctival mucosa without leaving evidences of their passage, revealed no other lesion than a small focus of tuberculosis in one of the subparotid glands. A veterinarian, who has had more or less meat-inspection experience at slaughter houses, witnessed the post-mortem examination, and when the small lesion was found spontaneously remarked, "Well, examined elsewhere than at an experiment station this animal would have been recorded as another no-lesion, tuberculin reactor."

My experience includes a number of cases in which long search was finally rewarded by the discovery of a tuberculous lesion in an unexpected and unusual location to account for a tuberculin reaction. And, in passing, I might say that the investigations that have been made in this country and in Europe strongly indicate that the conjunctival mucosa may be a commoner portal of entry for the tubercle bacillus than the meager attention it has received in the past would lead us to believe.

We may conclude that the results obtained in the Division of Pathology justify the assumption that reacting cattle, actually free from tuberculosis, are at most a small proportion of the reacting cattle in which no tuberculous lesions are found. And, in this connection, it should be remembered that cattle in which the tubercle bacillus has gained a sufficient hold to cause those changes on which a tuberculin reaction depends, with rare exceptions, no matter how insignificant the lesions may be at the time the test is made, sooner or later become disseminators of tubercle bacilli and dangerous sources of infection.

The third group of no-lesion reactors, cattle certainly free from anything to explain the reaction, I have tried to account for by assuming that they may be animals that have acquired their tuberculin sensitiveness through intense exposure to human tuberculous individuals. Ingested tubercle bacilli of the human type do not cause manifest tuberculosis in cattle, but experimentally it has been shown that cattle drenched with human tuberculous tissues, or suspensions of tubercle bacilli of the human type, may acquire a temporary tuberculin sensitiveness. It might throw some light on the subject if those who encounter no-lesion, tuberculin reacting cattle in herds free from tuberculosis, and free from exposure to bovine tubercle bacilli, would make inquiries regarding the possible exposure of the cattle to human subjects of tuberculosis.

But I must terminate this digression, which was made in compliance with a special request, and which seemed to be justified by the important part tuberculin plays in all our efforts to control and eradicate bovine tuberculosis, a part of so much importance that we may reasonably say, any unwarranted, adverse criticism of the tuberculin test must be looked upon as an attempt to weaken the foundation of all our modern efforts to prevent the dangerous dissemination of bovine tuberculosis.

To discuss all the agencies at length through which it may be assumed bovine tuberculosis can be disseminated would require more time than you would have the patience to listen to me, hence I will not attempt to do so.

The fact we should always have in mind when we consider other
agencies than immediate contact between the sources and the possible recipients of the infectious material of true contact diseases, is that anything which either preserves the virulence and vitality of the infectious material, or through which it can be rapidly transported from place to place, must be regarded as a sufficient agency for the dissemination of the disease. Another fact to be kept in mind is that anything that emanates from or has been in contact with the body of an infected animal, may be and often is a carrier of infection. Milk, for example, may be infected with tubercle bacilli because of udder tuberculosis; because of its contamination with discharges from the rectum or the vagina; because of material sprayed into it by coughing, tuberculous cows and because infected material, loosely attached to the exterior of the cow, has dropped into it.

Milk is an opaque bland substance. Pathogenic bacteria in it are protected against light and drying; they remain alive in it longer than the time required for it to sour and decompose. It moves rapidly from the farm to the creamery; is mixed with milk from other sources; is passed through a centrifuge to separate the cream, and the skim milk often rapidly goes back to the farm. Examinations made a few years ago of centrifuge slime from public creameries showed that 25% or more of the samples examined contained micro-organisms optically indistinguishable from tubercle bacilli. Hence, if tuberculosis is present in one dairy herd from which a creamery obtains milk, and the skim milk returned to the farms is fed to animals without first killing the tubercle bacilli it may contain by heating it or otherwise, there is no reason why tuberculosis should not be spread through it to all the farms that supply the creamery and have the skim milk returned to them.

As an agency for the dissemination of tuberculosis, or, for that matter, of any contact disease, raw milk and raw whey returned from creameries and cheese factories and fed raw to farm animals has an efficiency unsurpassed by any other kind of mediate contact between healthy and diseased animals, and in this respect is equalled only by immediate contact.

There is nothing new in this statement, but the fact it presents is of so much importance, both in its bearing on the protection of persons and animals against preventable infections, that it can bear frequent reiteration.

Contact through air is one of the agencies for the dissemination of tuberculosis that has received a great deal of attention, and, from my point of view, is often characterized as more important than the facts justify. The spray scattered from the mouths and noses of tuberculous animals probably does not infect the air with tubercle bacilli at a greater distance than, at most, eight to ten feet from its point of origin, and the tubercle bacilli enveloped in particles of dry matter, or dust, which are small enough to be carried from place to place by air currents, I do not believe to be alive and virulent. The smaller the particle of material in which a tubercle bacillus is embedded the more the germ is exposed to light, and light kills tubercle bacilli rapidly.

Some time is required for the material in which tubercle bacilli are expelled by subjects of tuberculosis to dry, and until it has dried it is not pulverized, and in the meantime the tubercle bacilli it contains lose their vitality.
While the agency of air for the dissemination of tuberculosis could be discussed at much greater length, the best measure I can give you of its importance probably is better expressed by a simple statement like the following than by any elaborate dissertation. For a period of six years I kept a herd of tuberculous cattle at a distance of only 28 feet from a healthy herd. No precautions were taken against the tubercle bacilli that could be carried from the tuberculous to the healthy herd through the agency of air, flies, rats, mice or birds. The healthy herd remained free from tuberculosis, notwithstanding that the tuberculous herd expelled tubercle bacilli in such abundance that practically all cattle that were brought into immediate contact with it became infected. Among others it included cows with advanced tuberculosis of the udder and uterus, and cows of which it was definitely proved that they were eliminating tubercle bacilli from their bodies via all channels to the exterior, including openings in discharging tuberculous abscesses.

Twenty-eight feet is not a long distance, and in this case the commoner winds, in winter and summer, blew from the tuberculous towards the healthy herd.

Flies caught in a tuberculous environment, in a cow stable harboring a tuberculous herd of cattle, have been definitely proved on a number of occasions to have tubercle bacilli both within and on the outside of their bodies, and living tubercle bacilli have been proved to occur in fly specks. But I know of no instance in which it has been proved that flies are successful agencies for the dissemination of tuberculosis, and I do know of several impressive instances in which they had the best opportunity to serve as such agencies and wholly failed. This is not an argument to encourage the breeding of flies, which may do much harm by scattering disease germs which, unlike the tubercle bacillus, multiply in milk and other articles of food.

Some birds have been shown to harbor tubercle bacilli of the bovine type after having ingested infected material, without showing lesions, but their efficiency as agents for the dissemination of bovine tuberculosis does not seem to be greater than that of rats, mice and flies, and currents of air that must traverse a greater distance than a few yards.

Water is another matter. I proved by a definite test that bovine tuberculosis may be carried by a stream of water quite a long distance. Unguarded drainage from infected herds, streams of water to which infected herds have access, and pools of water, especially in dry countries, from which many animals drink, I believe are among the important agencies for the dissemination of bovine tuberculosis.

In manure, protected against light and drying, tubercle bacilli remain alive and virulent quite long. In the deeper layers of a manure pile they may retain their virulence five or six months, as was proved at the Experiment Station by keeping hogs safely on a manure pile, in the upper layers of which the tubercle bacilli had died, and then causing them to contract tuberculosis by removing the upper ten to twelve inches of the pile.

Fresh manure, carried on the feet of persons who have been in contact with tuberculous cattle, especially if such persons tramp over the feed of healthy cattle, is dangerous. In this connection it is well to ask, are the
cattle exhibited at shows and sales sufficiently protected against the infectious material that may be thoughtlessly trampled into or on their feed during the period of exhibition? I have noticed repeatedly that some exhibitors place the feed of their animals where it can be walked on, rubbed against, and otherwise soiled by the feet, clothing, etc., of the people who attend the shows. Even if efforts are made to exclude all diseased animals from exhibitions, sales, etc., carriers and disseminators of disease germs are apt to get in, not through evil intent on the parts of their owners, but because our knowledge is not sufficient to detect all carriers of disease germs; and, as much as this may be regretted, does not promise to become sufficient in the near future.

I would strongly advise that all feed and drink of animals at live stock shows and sales should be so guarded that no part of it will become contaminated with anything that emanates from the body of an animal not a member of its own herd.

The facts we should keep in mind in dealing with the dissemination of bovine tuberculosis are that the tubercle bacillus, depending upon the medium in which it is enveloped, may be transported varying distances from its source before it is killed or loses its virulence; that tubercle bacilli exposed uncovered, or unprotected or only slightly protected against the action of light, die very quickly; that the more perfectly the tubercle bacillus is protected against light the longer it remains virulent and viable; that, protected against both light and drying, as it would be in a muddy stream of water or embedded in masses of feces or other material, it can be transported long distances before it loses its pernicious potency, and that tuberculous cows often begin to expel tubercle bacilli before they show sensible symptoms of tuberculosis.

I do not know whether I have discussed this old and important subject in a satisfactory manner. If I have failed to deal with phases in which anyone here may be particularly interested, I will be pleased to try at least to answer such questions as may be asked.

Dr. L. Van Ess: Listening to what has been said in regard to the relation of bovine tuberculosis to tuberculous disease in children one cannot well escape from the conclusion that in our efforts against this disease we must look upon it, not as a group of separate although related diseases, but as one, no matter in what animal species it is found to occur.

In support of such a view let me relate to you some results obtained in an investigation which we undertook in order to explain, if possible, the high incidence of tuberculosis in swine in the face of a diminishing tuberculosis morbidity in cattle. In this investigation we made an effort to ascertain the pathogenic affinities of the tubercle bacilli present in the lesions of swine affected with tuberculosis of the cervical and mesenteric lymphnodes. Such swine constitute as we know, the bulk of those retained on account of tuberculosis.

Thus far we have concluded our work with twenty-five lymphnode consignments. In none of these could bacilli of the mammalian type be found by cavia inoculation, yet the material obtained from 21 of those consignments produced tuberculosis in chickens. It was furthermore possible to make a field survey on 13 farms from which the swine involved
originated. In every case was the farm poultry flock found to be tuberculous and in only one of the 13 was the disease also found in the cattle.

It was further found that when swine on the farms mentioned were also tested that many of them only reacted to the avian tuberculin prepared by the use of mammalian bacilli.

The investigations are far from complete, but the results thus far obtained certainly indicate that in the matter of swine tuberculosis the avian origin of the disease must not be neglected.

Dr. C. P. Fitch: Dr. Van Ess has given us some very interesting data in respect to the spread of avian tuberculosis in swine. At University Farm at the University of Minnesota, we have been carrying on some experiments to determine the spread of avian tuberculosis through infected eggs. Some of the literature leads one to believe that a common method of the spread of avian tuberculosis is through the egg of infected fowls. We have up to the present time, examined 423 eggs from 19 tubercular fowls. These have been examined by inoculation into chickens and by cultures. The examination of these eggs has failed to show the undoubted presence of any tubercular bacteria. Three of the flasks inoculated with three different eggs and incubated, showed the presence of acid fast organisms. The inoculation of these cultures into chickens, however, fail to produce tuberculosis.

The above discussion follows Dr. Van Ess' remarks on the discussion of Dr. Ravenel's paper.

THE RELATION OF INDEMNITY TO TUBERCULOSIS ERADICATION

W. B. LINCOLN,
State Veterinarian of Tennessee.

It might be well for me to state in beginning, that the State of Tennessee pays no indemnity, as a state, for cattle that are reactors to the tuberculin test nor does it for any other disease for which animals are destroyed after appraisal. When an animal reacts to the tuberculin test it is appraised by three competent and disinterested free-holders and in no case is the owner awarded in excess of one-half the market value of the animal, such appraisal or indemnity cannot exceed $25.00 for a cow except in the case of purebred cattle, when the amount cannot exceed one hundred dollars. The appraisers make and deliver a written certificate giving all necessary information which, after being approved by the State Veterinarian, is returned to the owner of the animal, who presents same to the Chairman of his Court, and it then is a County charge, to be paid as other claims against the county are paid. There is therefore, no limit to the amount that may be paid for reactors in our state. Fortunately owing to our small percent of cattle reacting to the tuberculin test, it has never been a heavy or burdensome load for any county to carry. Many counties have never had such a claim to pay, and I doubt if any county has paid so much as $2,500.00 during the last ten years the law has been in effect.

Many owners have failed to have their reactors appraised, being satisfied with the salvage, which by the decision of the Supreme Court goes to the owner and not to the county. A very high per cent of our owners of reacting cattle have never availed themselves of their opportunity to
have a Federal appraisement made of their reactors, and I do not believe any of our breeders would stop cooperating in accredited herd testing even though they knew they could not have Federal appraisement made, and I further believe that even if we did away with the state appraisement, that no considerable number would stop, in fact I would be surprised if any stopped.

The advisability of paying indemnities, is of course, something for the various states to determine according to existing conditions. I cannot but feel that in many cases, it is wrong to pay indemnities. That the owners are in a large measure to blame for having cattle affected with tuberculosis, and especially is this true where they have a high percentage of reactors. The information regarding tuberculosis in cattle, and how to combat it, how to have herds free of tuberculosis, and how to maintain such herds as uninfected herds, has been available to breeders for many years, and because some were unscrupulous enough to maintain diseased herds, and sell diseased cattle and infected dairy products, to innocent people so long as the laws of the various states and cities would permit, and then when laws against such practices were put in effect; for the Federal Government and various states, to offer what may be called a premium for them to be good and clean up their herds, is to me a travesty on justice. The enlightened honest, upright breeders who did maintain clean herds, have to dig into their pockets to pay taxes to provide funds to pay these indemnities, I of course realize that many herds become infected through no fault of the owner. While it would be of no assistance in Tennessee, I sometimes think it would be best to let each owner, in other states, stand his own losses, and the enormous sums paid as indemnities be used in putting more veterinarians in the field to do the testing, and in that way hasten the day when we can truthfully say, our herds are free of tuberculosis.

Just one more thought. You are all aware of the fact that year in and year out a large percentage of the reactors come from the same herds, perhaps not so much so now as in the past. You can almost sit in your office and figure from whence a large percentage of your reactors will come. There is something wrong with a system that permits such owners to be paid indemnities for their reacting cattle.
DISCUSSION OF INDEMNITY

By T. E. Munce, State Veterinarian, Harrisburg, Pa.

In Pennsylvania we consider tuberculosis from five standpoints; namely,
Diagnosis,
Reactors,
Indemnity,
Sanitation,
Prevention.

I shall here endeavor to consider the subject of indemnity under:
1. Purpose for which paid;
2. Source from which obtained.

Purpose of Indemnity.

Is the purpose of indemnity to reimburse owners for loss already sustained? Is it livestock insurance? Or is not indemnity rather to assist owners to so place themselves that they may prevent further losses? In Pennsylvania indemnity is paid for the last-mentioned reason. Furthermore, the amount paid an owner should not be greater than the actual value of the individual animal appraised and condemned.

Owners of diseased animals should be required to assume at least part of the loss. Why not? Are they not responsible for the condition of their cattle?

Considerable sentiment has developed in Pennsylvania favorable to reducing the state limit to the same basis as paid by the Federal Government. To pay more than condemned cattle are worth or to be otherwise too liberal in the expenditure of public funds will injure the tuberculosis eradication cause.

Another matter I desire to utter a word of caution on is in connection with the appraisal of animals. There is a tendency upon the part of some appraisers to be too liberal in their appraisals. They seem to reason that because the owner can not receive an amount greater than the limit fixed by law it makes little if any difference as to the appraised value placed. Such appraisers give owners the impression that they will receive the limit allowed by law. This was recently illustrated upon an extensive scale in area testing in Pennsylvania. Every owner in one township was told by the inspector who tested in that township that they would receive a certain amount from the State-Federal Governments which was the limit. Owners who received less were disappointed and dissatisfied. The giving of such advice made the veterinarian more popular with the farmers and thus his work easier.

Sources of Indemnity.

Money for paying indemnity comes from three sources of taxation:
2. The State.
3. The County.

It does not come within the scope of us regulatory officials to determine the question as to whether or not indemnity should be paid for animals
condemned for tuberculosis. The question should be determined by the owners of livestock and those who pay the taxes. So long as money is appropriated for indemnity purposes we regulatory officials should confine our attention to the judicious expenditure of such funds. And in this connection we must be exceedingly careful. We can not afford to talk "millions" and act "thousands." We should advise against and discourage the appropriating of money for indemnity purposes in excess of the ability of our respective state administrative organizations to efficiently perform its duties.

Sooner or later the public will require the rendering of an account covering money expended and results obtained. Now, more than any other time in the history of animal disease control work, should care be exercised in the economical and judicious expenditure of indemnity funds; for the tuberculosis prevention and eradication work will progress and become permanent in proportion to public sentiment and confidence.

Our position may at times be trying. This is particularly true just now because there is a general demand for a reduction in taxes and increased appropriations. Lower taxes means less revenue and thus less money for indemnity. Increased indemnity appropriations mean increased revenue and thus higher taxes. We can not have both. We can not travel in opposite directions and reach the same place.

The points mentioned deserve our careful consideration; otherwise we regulatory officials shall not be prepared to cope with the changing conditions. We shall succeed in proportion to the thoroughness of the work done, our foresight and ability to solve future problems.

TO ALL ACCREDITED HERD OWNERS:

It is the desire of the Ohio Department of Agriculture and the U. S. Bureau of Animal Industry to eradicate bovine tuberculosis in Ohio as rapidly and economically as possible. It is believed that after a herd owner has received state and federal aid to the extent of placing a herd on the accredited list the owner should be willing to employ his accredited veterinarian to make the subsequent annual retest that his herd may be maintained on the accredited list, and that we may apply our service to area work and to the large number of herds awaiting a retest to become accredited.

The retest of an accredited herd is outlined in the uniform methods and rules of the state and federal herd agreement which is enclosed with special reference to (a), (b), (c), (d), (e) under paragraph six.

Indemnity will be paid by state and federal departments as long as available funds permit for any reactors found on this retest provided all rules and regulations of the accredited herd agreement have been faithfully observed.

We are enclosing a form of request to be filled out, signed and returned to this office after consulting your accredited veterinarian. We wish to assure you that we will assist in every way possible for you to maintain a tuberculosis-free herd.

Very truly yours,

State Veterinarian.
AGREEMENT

For the Tuberculin Testing and Supervision of Herds of Cattle.

In consideration of receiving assistance from the United States Bureau of Animal Industry and the Ohio Division of Animal Industry for the purpose of eradicating tuberculosis from my herd of cattle and maintaining it free from this disease, I, ........................................, do hereby agree to cooperate with said Bureau and State officials upon the following terms:

I WILL permit my entire herd, or any cattle of my herd, to be examined and to be tuberculin tested or retested at such times as are considered necessary by the Bureau and State officials.

I WILL present satisfactory identification of all animals including registry papers of pure breeds to the veterinarian conducting the test.

NO CATTLE shall be presented for the tuberculin test which have been injected with tuberculin within sixty days immediately preceding, or which have at any time reacted to a tuberculin test.

ANIMALS which react to the tuberculin test shall be immediately branded and tagged in accordance with State regulations. Such animals shall be immediately removed from the herd and disposed of as recommended by the Bureau and State officials.

I WILL allow no cattle to be associated with my herd which have not passed a tuberculin test approved by the Bureau or State officials. I will immediately notify the State Veterinarian of any additions to my herd giving the record of tuberculin test of such animals.

I WILL subject my premises contaminated by tuberculosis animals to a thorough cleaning and disinfection at my expense, under the direction or supervision of the Bureau or State officials, or their authorized representative. I will comply with all reasonable sanitary measures and other recommendations for the control of tuberculosis.

I AGREE to accept the indemnity for reacting cattle slaughtered, in accordance with the rules of compensation printed on back of this agreement, so long as available funds permit.

My herd is composed of ........................................ No. ................................ (Breed) (Pure Bred) (Grades)

In witness whereof I have signed this agreement this ........................................ day of ........................................ one thousand nine hundred and twenty........................................

........................................ Owner

Witness......................................... Address........................................
P. O. Address.................................... Location of herd........................................ Co.

......................................... Tp.

(Telephone Exchange and Number)
Rules of Compensation For Cattle Slaughtered.

1. No payment shall be made for any animals destroyed on account of tuberculosis unless the owner has complied with all lawful quarantine regulations and the agreement.

2. No indemnities will be paid for reactors except those found on regular herd tests by a State or Federal veterinary inspector.

3. Registration papers must be presented to appraisers to support appraisals on a pure bred basis. Where registration papers are not available, but application has been made for them before beginning the test, the animal may be appraised as a pure bred and as a grade, and a settlement will be made on a pure bred basis providing registration papers are in the hands of the State Veterinarian within thirty days of appraisal; otherwise, settlement will be made on a grade basis.

4. Compensation will not be allowed for steers, grade bulls and sterile cows.

5. The maximum of appraisal on each animal shall be $150 for pure bred cattle and $60.00 for grade cattle. The maximum to be paid will be two-thirds of the difference between the appraised value and the value of the salvage thereof; provided, in no case shall payment be more than $100 for any pure bred or $40.00 for any grade.

6. No indemnity will be paid for reactors unless premises have been cleaned and disinfected by the owner under the direction or supervision of a State, Federal or authorized veterinary inspector within fifteen days following the removal of the reactors, except where the owner receives written permission for an extension of time.

7. No indemnity will be paid unless the reactors are slaughtered within thirty days of date of reacting unless delay was caused by State or Federal authorities. Owners desiring to maintain a reactor on their premises beyond this time limit for its progeny may, upon permission of the Department, have the option of doing so with the understanding that the animal is never to be appraised and that it must be satisfactory isolated from the main herd until slaughtered.

8. No compensation will be paid to any owner of tuberculosis cattle whose entire herd is not under Federal and State supervision for the eradication of tuberculosis.

9. No indemnity will be paid for any animal if introduced into a herd under supervision within a period of less than six months prior to condemnation, unless said animal was obtained from a herd under State and Federal supervision for the eradication of tuberculosis.

10. No indemnity will be paid unless the owner states whether or not the animal or animals condemned are owned entirely by him or advises fully of any partnership and describes fully any mortgage or other liens against the animal or animals.
Dr. F. A. Zimmer,  
State Veterinarian,  
Columbus, Ohio.

Sir:

I am requesting that you authorize Dr. to conduct the annual tuberculin retest of my accredited herd of cattle, due during the month of at my expense, as provided in Section Six of the Accredited Herd Agreement.

My herd consists of head of cattle and is the same herd as in last year's test except cattle which have been added in accordance with the agreement.

I have an understanding with the above veterinarian that upon his receipt of your authorization, the test will be started on

It is understood that no indemnity will be paid by the State or Federal Bureau for any reactors found by this test.

I am, Very truly yours,

Owner of Herd.
Mr. Chairman and Members of the Association:

Your Committee on tuberculosis has experienced a very busy period during the present meeting of the Association. Many matters of extreme importance have been presented not only by its own personnel, but by others, who have a direct interest in the progress on the control and eradication of bovine tuberculosis. The Committee has made a sincere effort to solve the various problems which have been presented. In some cases it was found possible to decide upon definite recommendations, in others it was deemed advisable at this time to deviate from the work as now in operation.

It has become very apparent that the Committee on tuberculosis should have more time to deliberate on many of its problems. It is therefore recommended that in the future, all requests for modifications in the uniform accredited plan or on other matters having a bearing on the control and eradication of bovine tuberculosis, be submitted in writing to the Chairman of the Committee at least sixty days preceding the annual meeting.

The attention of the Committee has been called to the fact, that arbitrary requirements on the part of Municipal Departments of Health, regarding bovine tuberculosis are frequently not in accord with the uniform accredited herd plan, insofar that their requirements conflict with the provisions of this plan. It is therefore recommended that when such cases are brought to the attention of this Association, that the Committee on tuberculosis make an effort to obtain a modification of such requirements, making it possible for the owner to operate his herd under the accredited herd plan without jeopardizing the privilege of distributing his product.

All available information points to the fact that the work on the control and eradication of bovine tuberculosis can be further advanced by permitting accredited veterinarians to retest accredited herds as provided in Section 6 paragraph A, of the uniform accredited plan. A general compliance with this provision is therefore recommended.

It is urged that this Association recommend to the U. S. Secretary of Agriculture that when 15 per cent of the total Federal Indemnity allotted to be paid for tuberculous cattle, tuberculin tested by accredited veterinarians, is not sufficient to meet the demands in a given state, that an additional amount of the State allotment shall be used provided sufficient funds are available.

If this recommendation is accepted by the U. S. Department of Agriculture, Section 6, paragraph F of the Uniform Accredited Plan, shall then be changed to read as follows:

Upon written instructions from the proper state official, accredited veterinarians may conduct tuberculin tests at the owner's expense on herds in the process of accreditation in states which approve of this method of testing, until all animals in the herd have 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 further provide that when 15 per cent of the total Federal
Indemnity allotted to each state is not sufficient to meet the demands in a given State, for cattle which may react to tests conducted under this plan by accredited veterinarians, then an additional amount of the State allotment shall be used provided sufficient funds remain available.

M. JACOB, Knoxville, Tenn., Chairman,
W. F. CREWE, Bismarck, N. D.
J. A. KIERNAN, Washington, D. C.
C. E. COTTON, St. Paul, Minn.
S. E. BRUNER, Harrisburg, Pa.
REPORT OF THE LEGISLATIVE COMMITTEE OF THE UNITED STATES LIVE STOCK SANITARY ASSOCIATION
FOR THE YEAR 1923

H. R. SMITH, Chairman.

Much new legislation has been enacted during the past year particularly with reference to the control and eradication of tuberculosis. Certain states have passed laws to provide for area testing on a broad scale and appropriations have been materially increased. Some of the members of your legislative committee have been active in promoting this new legislation. It is of interest to know that there has been a very large increase in state appropriations for tuberculosis eradication. Six years ago the entire fund, both National and State, did not exceed $300,000. We now have a Federal appropriation of $2,878,000 and state appropriations totaling $7,200,000, which give a combined fund of a little more than $10,000,000 for tuberculosis eradication this fiscal year. In this amount is included county funds appropriated by Boards of Supervisors for cooperative work with the State and Federal Governments.

Personally, I feel that county appropriations are very desirable not only to increase funds provided by the Federal Government and States, but also to arouse more local interest in tuberculosis eradication work. People seem to have a higher regard for work of this character when they take part in financing the project through the use of local funds.

The volume of work done is in proportion, in a large measure, to the funds available for the payment of indemnity, and hiring of veterinarians. There is need of a much larger fund if the work is to be extended as it should be, and county participation offers the best means of securing the needed increase.

Because of the advantages that are derived by the people of a county through having all cattle tested and the county placed on the accredited list, it seems logical that the local people, through a county levy, should be willing to make liberal appropriations to supplement funds supplied by the Federal Government and State. In certain counties that have already been accredited there has been a material increase in the value of the breeding cattle. The Commissioner of Agriculture of the State of Michigan sent letters to all live stock auctioneers in Hillsdale County, Michigan, and these men were unanimous in saying that grade breeding cattle in that county, which was accredited last July, are now bringing from ten to twenty dollars per head more than the same class of cattle in surrounding counties. A large number of farmers in the county have already received the ten cent premium above selling price on their hogs. To date this premium has been paid on approximately six thousand hogs produced in Hillsdale County.

The Minnesota Co-operative Creamery Association has recently been offered a premium of two cents per pound above New York Extra which commands the top price, for all butter produced in Meeker County, Minnesota, which has recently been once tested and will undoubtedly be placed on the accredited list in the near future. There are other local advantages that could be mentioned and it would seem that we should expect in the
near future liberal funds from counties for carrying forward this im-
portant work.

The State of Iowa has a very comprehensive new law for the inaugu-
ration of county area testing. It is comprehensive because it not only
provides a plan for operation, but also the means of financing the propo-
sition. When 51% of the cattle owners sign applications for county area
testing, it becomes mandatory upon the Board of Supervisors to make a
levy of not to exceed three mills on all taxable property. When 75%-
sign applications it becomes compulsory for every cattle owner in the
county to have his herd tuberculin tested. Under the Iowa law the fund
is preserved by what is called the five percent clause. If the loss on
reactors slaughtered does not exceed 5% of the appraised value the owner
receives no indemnity.

Minnesota has new legislation which provides that when 51% of the
cattle owners sign applications for county testing the Board of Super-
visors may appropriate a sum representing twenty-five cents per head
of the breeding cattle population (of the cattle) to pay operating ex-
penses. Seven counties have already qualified and six more will in the
near future. Forty-two counties in Illinois have appropriated approxi-
mately $4,000 each to provide funds for operating expenses. Indemnity is
paid out of the state appropriation of $1,000,000 this biennium and the
Federal allotment. In Michigan forty counties have appropriated a total
of $200,000 for operating expenses. In Kansas all indemnity is paid out
of county and Federal funds. In Missouri the Federal Government pays
one-third and the State one-sixth and the county one-sixth. This, how-
ever, is not new legislation in the cases of Missouri and Kansas. Certain
other states have laws recently passed which give counties the authority
to make appropriations for this work and it may reasonably be expected
that during the next few years there will be a great increase in county
funds, which is a thing to be encouraged so long as a centralized control
of the work can be preserved through the medium of the Federal Gov-
ernment and the states cooperating.
President Butler: If there is nothing before the house we will now proceed with the election of officers.

The following officers were elected in due form:

PRESIDENT,
J. G. Ferneyhough, Richmond, Va.

VICE-PRESIDENTS AND EXECUTIVE COMMITTEE,
J. H. McNeil, Trenton, N. J., First Vice-President and Chairman.

SECRETARY AND TREASURER,
O. E. Dyson, Kansas City, Missouri.

President Butler: Are there any questions, or is there any business to come before the Association before we adjourn?

On motion, duly seconded and carried, the Twenty-seventh Annual Meeting of the United States Livestock Sanitary Association adjourned sine die.