PROCEEDINGS

Forty-Third Annual Meeting

of the

United States Live Stock Sanitary Association

HOTEL MORRISON, CHICAGO, ILL.

December 6-7-8, 1939
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TABLE OF CONTENTS

First Session, Wednesday Morning, December 6, 1939

Welcome to Illinois—H. P. Rusk 2
Response to Address of Welcome—John R. Mohler 7
Translation of the Remarks Made by Professor Ettaine Letard 11
Address of the President—J. L. Axby 12
Some Relations of Kidney Physiology to the Diagnosis of Kidney Disease—R. M. Watrous 18

Second Session, Wednesday Afternoon, December 6, 1939

The Present Status of the Federal-State Bang's Disease Program—A. E. Wight 28
Bang's Disease Control from the Standpoint of the Animal Breeder—R. E. Short 35
Problems Arising in Bang's Disease Control in the Western States—W. H. Hendricks 38
Remarks by Congressman Gillie 54
Preparation of Brucella Antigen—Eichhorn and Thaller 55
Report of the Committee on Bang's Disease 67
Importance of State Wide Meat Inspection—George E. Corwin 70
Meat Inspection in the Northwest—I. W. Ringer 84
The Kellogg Foundation—Robert B. Harkness 97

Third Session, Thursday Morning, December 7, 1939

The General Tuberculosis Situation—A. E. Wight 106
The Pathogenicity for Cattle of Avian Tubercle Bacillus—Feldman and Karlson 114

iii
Reaccreditation of Modified Accredited Counties in the State of New York—E. T. Faulder 133
Fundamentals of Animal Disease Control—D. M. Campbell 137
Report of the Committee on Meat and Milk Hygiene 143
Infectious Equine Encephalomyelitis in 1939—Schoening, Giltner, and Shahan 145

Fourth Session. Thursday Afternoon, December 7, 1939
Report of the Committee on Rabies 151
Rabies Control from the Clinician's Viewpoint—J. V. LaCroix 162
Some New Facts on Rabies Control in Europe—Adolph Eichhorn 167
Field Control and Eradication of Avian Tuberculosis in Poultry and Swine in the Midwest—J. P. Simmons 173
Progress of the National Poultry Improvement Plan with Special Reference to the Control of Pullorum Disease—Berley Winton 176
Equine Encephalomyelitis in Avian Hosts—F. R. Beaudette 185
The Control of Poultry Diseases by the Veterinarian: A Challenging Situation—Cliff D. Carpenter 203
Turkey Disease Control in Commercial Flocks—L. D. Frederick 212

Fifth Session. Friday Morning, December 8, 1939
Report of the Committee on Transmissible Diseases of Swine 218
Report of the Committee on Association Publication 221
Infectious Types of Swine Enteritis—L. P. Doyle 224
Swine Enteritis in Veterinary Practice—J. B. Bryant 231
Discussion of Swine Enteritis—J. S. Koen 243
So-Called Protein Poisoning in the Feeding of Swine—A. F. Schalk 245
Discussion of Protein Poisoning—H. C. H. Kernkamp 254
Committee Report on the Summarization of Laws and Regulations Governing the Interstate Movement of Live Stock 256
Joint Report of the Committee on Unification of Laws and Regulations and the Committee to Summarize Laws and Regulations Governing Interstate Movement of Live Stock. 264
Report of the Committee on Resolutions. 271
Report of the Committee on Tick Eradication in 1939. 275
Report of the Committee on the Revision of the Constitution and By-Laws. 277
Report of the Auditing Committee. 277
Report of the Committee on the Transmissible Diseases of Poultry. 278
Report of the Committee on Miscellaneous Transmissible Diseases. 283

Sixth Session, Friday Afternoon, December 8, 1939

Report of the Special Committee on Poultry and Rabbit Meat Inspection. 285
Report of the Committee on Legislation. 296
Report of the Committee on Policy. 298
Report of the Committee on Tuberculosis. 299
Report of the Committee on Parasitic Diseases. 301
Report of the Nominating Committee. 307
Installation of Officers. 308
Financial Statement. 311
OFFICERS AND COMMITTEES—1940-1941

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# HISTORICAL

Records of the early meetings of the Interstate Association of Live Stock Sanitary Boards are very meager. The first meeting of the organization was held in Fort Worth, Texas, September 28-29, 1897, primarily to inspect a vat for dipping cattle and sheep that had been constructed in that city. The name of the organization was changed at the 13th annual meeting held in Chicago, Ill., in 1909, to the United States Live Stock Sanitary Association. All meetings since 1909 have been held in Chicago.

<table>
<thead>
<tr>
<th>Meetings</th>
<th>Date</th>
<th>Place</th>
<th>President</th>
<th>Secretary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Sept 28-29</td>
<td>1897</td>
<td>Fort Worth, Tex.</td>
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<tr>
<td>2</td>
<td>1898</td>
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<tr>
<td>3</td>
<td>1899</td>
<td>Chicago, Ill.</td>
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<td>*</td>
</tr>
<tr>
<td>4</td>
<td>1900</td>
<td>Louisville, Ky.</td>
<td>*</td>
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</tr>
<tr>
<td>5 Oct 8-9</td>
<td>1901</td>
<td>Buffalo, N. Y.</td>
<td>E. P. Niles</td>
<td>F. T. Eisenman</td>
</tr>
<tr>
<td>7 Sept 22</td>
<td>1903</td>
<td>Denver, Colo.</td>
<td>W. E. Bolton</td>
<td>Hon. W. P. Smith</td>
</tr>
<tr>
<td>8 Aug 23-25</td>
<td>1904</td>
<td>St. Louis, Mo.</td>
<td>J. C. Norton</td>
<td>Hon. W. P. Smith</td>
</tr>
<tr>
<td>9 Dec</td>
<td>1905</td>
<td>Guthrie, Okla.</td>
<td>Hon. W. P. Smith</td>
<td>S. H. Ward†</td>
</tr>
<tr>
<td>10 Aug 15-16</td>
<td>1906</td>
<td>Springfield, Ill.</td>
<td>M. M. Hawkins</td>
<td>S. H. Ward†</td>
</tr>
<tr>
<td>12 Sept 14-16</td>
<td>1908</td>
<td>Washington, D. C.</td>
<td>Chas. G. Lamb</td>
<td>C. E. Cotton</td>
</tr>
<tr>
<td>14 Dec 5-7</td>
<td>1910</td>
<td>Chicago, Ill.</td>
<td>Chas. E. Cotton</td>
<td>J. J. Ferguson</td>
</tr>
<tr>
<td>15 Dec 6-8</td>
<td>1911</td>
<td>Chicago, Ill.</td>
<td>John F. DeVine</td>
<td>J. J. Ferguson</td>
</tr>
<tr>
<td>16 Dec 5-12</td>
<td>1912</td>
<td>Chicago, Ill.</td>
<td>Mazvck P. Ravenel</td>
<td>J. J. Ferguson</td>
</tr>
<tr>
<td>17 Dec 2-4</td>
<td>1913</td>
<td>Chicago, Ill.</td>
<td>Peter F. Bahnsen</td>
<td>J. J. Ferguson</td>
</tr>
<tr>
<td>18 Feb 16-18</td>
<td>1915</td>
<td>Chicago, Ill.</td>
<td>S. H. Ward†</td>
<td>J. J. Ferguson</td>
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<td>19 Dec 2-3</td>
<td>1915</td>
<td>Chicago, Ill.</td>
<td>J. I. Gibson</td>
<td>J. J. Ferguson</td>
</tr>
<tr>
<td>20 Dec 6-7</td>
<td>1916</td>
<td>Chicago, Ill.</td>
<td>O. E. Dyson†</td>
<td>J. J. Ferguson</td>
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<td>21 Dec 2-4</td>
<td>1917</td>
<td>Chicago, Ill.</td>
<td>J. G. Wills</td>
<td>S. H. Ward†</td>
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<tr>
<td>22 Dec 2-4</td>
<td>1918</td>
<td>Chicago, Ill.</td>
<td>M. Jacob</td>
<td>S. H. Ward†</td>
</tr>
<tr>
<td>23 Dec 1-2</td>
<td>1919</td>
<td>Chicago, Ill.</td>
<td>G. W. Dumphy†</td>
<td>D. M. Campbell</td>
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<tr>
<td>24 Nov 29-30-</td>
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<td>Dec 1</td>
<td>1920</td>
<td>Chicago, Ill.</td>
<td>S. F. Musselman†</td>
<td>D. M. Campbell</td>
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<tr>
<td>25 Nov 28-30</td>
<td>1921</td>
<td>Chicago, Ill.</td>
<td>W. F. Crewe†</td>
<td>Theo. A. Burnett</td>
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<td>26 Dec 6-8</td>
<td>1922</td>
<td>Chicago, Ill.</td>
<td>T. E. Munce†</td>
<td>Theo. A. Burnett</td>
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<tr>
<td>27 Dec 5-7</td>
<td>1923</td>
<td>Chicago, Ill.</td>
<td>W. J. Butler</td>
<td>O. E. Dyson†</td>
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<tr>
<td>28 Dec 3-5</td>
<td>1924</td>
<td>Chicago, Ill.</td>
<td>J. G. Ferneybough†</td>
<td>O. E. Dyson†</td>
</tr>
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<td>29 Dec 2-4</td>
<td>1925</td>
<td>Chicago, Ill.</td>
<td>J. H. McNell†</td>
<td>O. E. Dyson†</td>
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<tr>
<td>30 Dec 1-5</td>
<td>1926</td>
<td>Chicago, Ill.</td>
<td>John R. Mohler</td>
<td>O. E. Dyson†</td>
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<td>31 Nov 30-</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Dec 1-2</td>
<td>1927</td>
<td>Chicago, Ill.</td>
<td>L. Van Es</td>
<td>O. E. Dyson†</td>
</tr>
<tr>
<td>32 Dec 2-5</td>
<td>1928</td>
<td>Chicago, Ill.</td>
<td>C. A. Cary†</td>
<td>O. E. Dyson†</td>
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<td>33 Dec 4-6</td>
<td>1929</td>
<td>Chicago, Ill.</td>
<td>Chas. G. Lamb</td>
<td>O. E. Dyson†</td>
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<tr>
<td>34 Dec 3-5</td>
<td>1930</td>
<td>Chicago, Ill.</td>
<td>A. E. Wight</td>
<td>O. E. Dyson†</td>
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<tr>
<td>35 Dec 2-4</td>
<td>1931</td>
<td>Chicago, Ill.</td>
<td>J. W. Connaway</td>
<td>O. E. Dyson†</td>
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<td>36 Nov 30-</td>
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<tr>
<td>Dec 1-2</td>
<td>1932</td>
<td>Chicago, Ill.</td>
<td>Peter Malcolm</td>
<td>O. E. Dyson†</td>
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<td>37 Dec 6-8</td>
<td>1933</td>
<td>Chicago, Ill.</td>
<td>E. T. Faulder</td>
<td>O. E. Dyson†</td>
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<tr>
<td>38 Dec 5-7</td>
<td>1934</td>
<td>Chicago, Ill.</td>
<td>T. E. Robinson</td>
<td>O. E. Dyson†</td>
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<td>39 Dec 4-6</td>
<td>1935</td>
<td>Chicago, Ill.</td>
<td>Edward Records</td>
<td>O. E. Dyson†</td>
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<tr>
<td>40 Dec 2-4</td>
<td>1936</td>
<td>Chicago, Ill.</td>
<td>Walter Wilsicky</td>
<td>L. Enos Day†</td>
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<td>41 Dec 1-3</td>
<td>1937</td>
<td>Chicago, Ill.</td>
<td>R. W. Smith</td>
<td>L. Enos Day†</td>
</tr>
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<td>42 Nov 30-</td>
<td></td>
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<tr>
<td>Dec 1-2</td>
<td>1938</td>
<td>Chicago, Ill.</td>
<td>D. E. Westmorland</td>
<td>L. Enos Day†</td>
</tr>
<tr>
<td>43 Dec 6-8</td>
<td>1939</td>
<td>Chicago, Ill.</td>
<td>J. L. Axby</td>
<td>L. Enos Day†</td>
</tr>
</tbody>
</table>

*Information not available. †Deceased. ‡Dr. Musselman died October 27, 1920. Dr. W. F. Crewe, third vice-president, presided at the 1920 meeting. **Filled the unexpired term of L. Enos Day, who died April 1920. This information was supplied in the main by Dr. D. M. Campbell and D. F. Lucky.
Report of the Proceedings
of the
Forty-Third Annual Meeting
of the
UNITED STATES LIVE STOCK
SANITARY ASSOCIATION
Chicago, Ill., December 6-8, 1939

WEDNESDAY MORNING SESSION,
DECEMBER 6, 1939

The opening session of the Forty-third Annual Meeting of the United States Live Stock Sanitary Association, held at the Morrison Hotel, Chicago, Illinois, December 6-8, 1939, convened at 10:25 A.M., Dr. J. L. Axby, president of the association, presiding.

PRESIDENT AXBY: Gentlemen, will you please come to order? I now declare the Forty-third Annual Meeting of the United States Live Stock Sanitary Association duly assembled and ready to transact such business as may properly come before it. In the Constitution and By-Laws is the regular order of business. It is in conflict with the printed program. I will entertain a motion as to which one you want to follow—the program or the regular order of business.

DR. A. C. TOPMILLER: I would like to make a motion that we follow the regular printed program in lieu of the regular program. . . . The motion was severally seconded, voted upon, and carried unanimously.

PRESIDENT AXBY: In accordance with an established precedent, it has been the custom to have at the first meeting, some gentleman on the program who is of renown, and at the same time have him speak on some subject that is instructive and entertaining. Gentlemen, on this occasion, we have with us a gentleman who incorporated in this address, as well, a welcome to Illinois.

It is a very unique and distinct privilege for me to present to you H. P. Rusk, dean of the College of Agriculture, University of Illinois, who will welcome the assemblage to Illinois.

DEAN RUSK (Applause.)
WELCOME TO ILLINOIS

By H. P. RUSK, Dean, College of Agriculture, University of Illinois.

On behalf of the live stock industry of Illinois, I am glad to extend official greetings to the United States Live Stock Sanitary Association. The farm people of Illinois appreciate the importance of live stock sanitary science and its application to the economic production of domestic animals. They are also beginning to recognize its relationship to public health.

The contributions of your Association and of the related fields of veterinary science and practice to the control of Texas fever, tuberculosis, Bang's disease, hog cholera, and many other animal diseases, are well known and appreciated as important factors in economic live stock production.

We need a more general recognition of the importance of live stock sanitation to public health. Securing this recognition is dependent upon a program of public education that will result in better understanding of the significance and relationship of animal disease to actual cases of human suffering. It is not enough to know that the first dozen cases of undulant fever in down-state Illinois were suspected and suggested to physicians by veterinarians. The public should know that the causative agent of this disease is identical with that responsible for serious losses in domestic animals and that the reservoir of contagious materials for future cases of undulant fever lies not in the human host but in the highly developed live stock industry of our most prosperous agricultural areas.

I have always been an advocate of extension work in veterinary science for members of the profession and indirectly through the profession for the live stock producer. However, I am beginning to believe that we may have a greater responsibility for the direct education of the general public than we have recognized up to this time. I am convinced that we shall not make the progress we should in
live stock sanitation and disease control until the man who pays the bill either in professional fees or through live stock losses has a better understanding of what sanitary science and competent veterinary service can contribute to the success of his enterprise. I am also convinced that this type of education should not be confined to the live stock producer. The general public should know more about the potential reservoirs in wild and domestic animals for such diseases as Rocky Mountain spotted fever, tularemia, tuberculosis, rabies, actinomycosis, septic sore throat, trichina, and many others concerning which you are much better informed than I.

Sanitation is, of course, the practical approach to the control of many live stock diseases and the prevention of their spread to the human host. The principles of sanitation are tangible and for the most part can be understood by live stock producers and the public. This has been well illustrated in our state by the successful adoption of the so-called McLean County System of Swine Sanitation which is nothing more than a recognition of the fact that clean hogs, clean houses, and clean ground are good insurance against parasitism and other diseases. I recognize that I am not telling the members of the United States Live Stock Sanitary Association anything new about sanitation, but I hope I am demonstrating that a layman can grasp the fundamentals of sanitation and that it is desirable to disseminate more generally information regarding the principles of sanitation and their application to live stock production and public health.

I have stressed public education first, not because I believe it is more important than research, practice, or regulation, but because it seems to me that the public, generally, has a very inadequate conception of the mass of practical information already available through the veterinary profession, from past research; and for that reason education appears to offer the most immediate results for better control of live stock diseases and for more adequate safeguards to public health.
A sound educational program must be based upon facts—not faith, hope, charity, or wishful thinking, and facts are usually the result of patient, careful, and unbiased research. Sanitary science and veterinary medicine have profited much from the research of a long line of distinguished investigators. It is upon the results of their research that the program of your organization is based. The continued growth and the expansion of opportunities for public service by this organization depend upon a continuous program of research. Modern industry has long since learned that the results of research constitute the growth hormone in the life blood of every progressive business and that education constitutes the circulating medium for this growth-promoting factor. Research and education are both fundamental to progress. In these programs of research and education, the U. S. D. A. and the Land-Grant Colleges and Universities have a great opportunity and a grave responsibility. This responsibility cannot be discharged unless public opinion is favorable to adequate financial support. On the 16th of last month, Dr. Charles M. A. Stine, an executive vice-president of E. I. du Pont de Nemours & Company, speaking before the Association of Land-Grant Colleges and Universities said, "Although the problems confronting it are of the most highly complex and diversified nature, agriculture in this country is not making nearly as great a research effort as is other American industry. For example, the chemical industry, which has forged ahead even under depression brakes, spends from 2 per cent to 4 per cent of its annual gross sales revenue on research. Agriculture, in contrast, spends only about 1/7 of 1 per cent of the value of its products on research". He pointed out that "as much as $240,000,000 might be expended annually in the United States on agricultural research, and the expenditure would not be at all fantastic or out of line with the need. That sum would be only 3 per cent of an eight-billion-dollar farm income". I think Dr. Stine somewhat underestimated the amount spent on agricultural research, but if the figure is 2/7 instead of 1/7 of a per cent, the contrast between amounts spent for research by industry and by agriculture is still marked.
One obvious difficulty in financing agricultural research is the fact that the six million farmers in the United States do not have a board of directors with power to vote a research budget for the industry as a whole or for any considerable segment of that industry. The major support for agricultural research in the past has come from public taxation and it seems probable that support must continue to come from that source. But certainly research on animal disease with its many significant relationships to public health should receive hearty and grateful public support. I believe more adequate appropriations for this kind of research would be forthcoming if the public had a better appreciation of the problems involved.

At the present time there is before the Congress of the United States a bill for the appropriation of five million dollars of Federal money for research, education, and regulatory work in marketing agricultural products. This is Senate Bill No. 2212 sponsored by the various state departments of agriculture, regulatory bodies of which many of you are members. If matched by state funds as provided for in the Act, it will make available an amount of money approximately equal to 2/3 of the total now spent for agricultural research in all state agricultural experiment stations in the country and many times the amount spent by these same experiment stations for research on diseases of both plants and animals. This bill has passed the Senate and, I am told, has a good chance to pass the House at the next session of Congress. Now I am not contending that this bill does not have merit; marketing is one of agriculture's very important problems. Research in that field appears to have unusual promise, and public opinion of the hour is favorable toward measures of economic import. I merely cite this as an illustration of the power of public opinion as influenced by widespread publicity and agricultural extension service teaching during the last few years. But I wonder if the general public would not benefit as much or more from an equal amount of money spent on research in the field of disease control. Nearly 20 years ago the Board
of Trustees of the University of Illinois submitted to the Fifty-Second General Assembly of the State Legislature, a plan for the establishment of an "Institute of Pathology" to be devoted "exclusively to investigation in the methods and means of control of communicable diseases, especially those common to animals and man, and probably to plants" and proposed a maintenance budget of $100,000 to $125,000 for the biennium. The only reason this proposal did not receive favorable consideration was the fact that public opinion had not been educated to the value of such a program and the only unsound feature of the proposal was that it did not ask for enough money.

Research is basic to progress in education, practice, and regulation. In this country we have been prone to get the cart before the horse. It sometimes appears that we have completely reversed the proper sequence and rate them in the following order — regulation, practice, education, and research. However, I believe that the leaders in this field have a sound conception of the fundamental importance of logical order and I hope that the establishment of two federal regional laboratories for the study of animal disease marks the beginning of a more generous program for the support of research in this important field. It is, of course, true that research is sterile unless the results are translated into practice and regulation through education, but I have no fears regarding the proper utilization of the results of research. No one who faces, without prejudice, the record of the years can fail to recognize that as a direct result of research and education, man lives better and longer, is healthier, and has within his reach more opportunity for happiness today than ever before in the history of the world.

In closing, let me assure you, that the live stock industry of Illinois and the Nation appreciates the great work done by the members of the United States Live Stock Sanitary Association. The importance of preventing the spread of disease through interstate shipment of potential carriers is recognized by live stock producers generally and you have the hearty support and approval of the live stock industry in
your attempts to secure more uniform and more effective regulations governing both interstate and intrastate shipments of live stock.

On behalf of the University of Illinois and the other Land-Grant institutions, I wish to assure you of our desire to cooperate with you in every way that research and education can contribute to your program.

Again I welcome you to Illinois and invite you to continue to hold your annual meetings in our State.

PRESIDENT AXBY: Response to this welcome by Dean Rusk will be made by the Chief of the Bureau of Animal Industry, a friend of all sanitarians, and a man who in the United States or in the world may have an equal, but does not have a peer, our own Dr. John R. Mohler. He also has a surprise. It is going to be very interesting and I will leave it to him to announce that. Dr. Mohler. (Applause.)

DR. JOHN R. MOHLER: Mr. President, Dean Rusk, Friends and Guests: The first I knew was to appear this morning was when I received a copy of the program ten days ago. I immediately wrote to your affable secretary and told him that two previous appointments has already been made for me, at ten, and ten-thirty this morning, and suggested that he draft someone else. It was not many days before I received an airmail letter to the effect that I was to select a pinch-hitter, and, in addition, that there would be a member of the French Commission here this morning who should be announced at this time.

Of course that put an international phase to the question, but, upon my request, Dr. Eichhorn very kindly consented to substitute for me in case I could not switch my appointment, and provided I would prepare the talk. However, I was able to make the switch, so here I am this morning serving in the dual capacity of responding to Dean Rusk and also of introducing my French colleague.

RESPONSE TO ADDRESS OF WELCOME
OF DEAN H. P. RUSK

By Dr. John R. Mohler.

Mr. President, Dean Rusk, Friends and Guests: In extending our sincere thanks to Dean Rusk for his presence at this meeting and for his cordial address of welcome, I am
confident that I voice the unanimous sentiment of this Association. In former years many of our members have had the privilege of knowing him rather closely and today we all share in this opportunity and privilege. As we are welcomed by Dean Rusk, here in the metropolis of Illinois, it seems fitting to congratulate the University of this State on the selection of Professor Rusk, formerly head of the Animal Husbandry Department, to become dean of the College of Agriculture and director of the Experiment Station and Extension Service. This well-deserved promotion, which occurred last September, gives us the satisfying assurance that the livestock industry of this State is in good hands. There is abundant evidence also that his influence will be evident throughout the country.

In addition I wish to commend the United States Live Stock Sanitary Association on its broad policy in inviting outstanding members of other professions to take part in its deliberations. In the past we have enjoyed the messages of the medical profession, agricultural commissioners, prominent industrialists, and agricultural editors. Today we have enjoyed and benefited by the message of Dean Rusk who has contributed so much at the University to research and education in animal breeding and nutrition as well as supervising an important veterinary unit. Among other fields of endeavor he has rendered notable service in the National Research Council and has long been a prominent and active member of the American Society of Animal Production. In recent years, with increasing knowledge of nutritional diseases and the many veterinary problems affected by feeding and management, the relationship between veterinary science and animal husbandry has become increasingly close.

Although for convenience professional workers engage in different fields of endeavor, yet actually, science recognizes no distinct boundaries. Accordingly, it is highly gratifying to know that when the fields of veterinary science and animal husbandry coincide or overlap, any goings or comings across the line are not cases of trespass but rather friendly meetings
between understanding groups. I sincerely trust that these relationships between veterinary science and animal husbandry may always continue in this friendly harmonious spirit.

In keeping with this thought let me digress to comment briefly on “A Tribute to the Stockman,” written by the late Dean H. W. Mumford, whom Dean Rusk succeeded at the University of Illinois. This tribute was written in 1917 and has subsequently appeared many places in print. As though with prophetic words, Dean Mumford, in describing the stockman, describes our previous speaker, Dean Rusk. I quote the following:

“His coming is greeted with demonstrations of pleasure, and his going with evident disappointment.

“His calm, well-modulated voice inspires confidence and wins affection.

“To him there is rhythm in the clatter of the horse's hoof, music in the bleating of the sheep and in the lowing of the herd.

“Herdsman, shepherd, groom — yes, and more.

“Broad-minded, big-hearted, whole-souled; whose life and character linger long after the cordial greeting is stilled and the hearty handshake is but a memory; whose silent influence forever lives.” (Pause.)

The foregoing sentiment so aptly describes our guest speaker and others in the profession he represents, that I consider it appropriate for the present occasion.

In 1935 Congress passed the Bankhead-Jones Act which provides for a limited number of specialized laboratories in the major agricultural regions of the country. One of these was established by Secretary Wallace at the University of Illinois which provided housing for the laboratory. At present the work is confined to the study of soy beans and their products, as Illinois produces more soy bean seed than any other State. However, this is a cooperative project
between the Department of Agriculture and the 12 contiguous States, from North Dakota on the northwest to Ohio on the east.

Probably you are more familiar with the four similar regional laboratories established under this Act and supervised by the Bureau of Animal Industry. One is located at Auburn, Ala., for the study of infectious and parasitic diseases, another at East Lansing, Mich., for research on the viability of poultry, and the remaining two at Ames, Iowa, and Dubois, Idaho, where problems in swine breeding and sheep breeding, respectively, are under investigation.

By the Agricultural Adjustment Act of 1938, the Department of Agriculture was authorized to establish four $1,000,000 regional research laboratories to develop new and wider uses for farm products, especially surplus crops, on a nation-wide basis.

Secretary Wallace on October 18 last laid the corner stone of one of these laboratories at the Northern Research Laboratory, at Peoria, Illinois, which will cooperate with the same 12 States previously mentioned. In the initial stage of the program, the work will be concentrated on corn, wheat, and farm waste products. So you see Dean Rusk, the agricultural merits of the great State of Illinois are appreciated and I again wish to express our thanks for the cordiality of your welcome.

Now it is my pleasure to present Prof. Ettaine Letard, director of the Department of Zootechnics at the Government Veterinary College, Alfort, France, whose attainments in veterinary science abroad are well known to many of this body. Professor Letard is one of the members of the Purchasing Commission of the French Government, who has been detailed to this country for the procurement of horses for replacement purposes in France.

DR. MOHLER: Professor Letard is well known to many of the members of the veterinary profession in this country, and it is indeed a great pleasure to give you Professor Letard, and I hope you will receive him with a rising recognition.

(The audience arose and applauded.)
TRANSLATION OF THE REMARKS MADE
BY PROFESSOR ETTAINE LETARD

Colleagues: I am sorry that I have to speak in my mother language and not in yours. I am unhappy that I cannot use your language. You are perhaps astonished that a professor is not able to speak your language, but I must say that if I do not speak English, I read it, and I read all of your publications which we most appreciate in France. I am most proud to collaborate with some American papers like the Journal of Heredity.

I am very happy that your President and Secretary Merillat gave me the opportunity to come here and express our feelings. I also want to say here in public that I think most of my colleagues here give us the profit of their experience and give us all we need from a technical point of view.

It is a grand occasion for me to return the visit you made at the Maison Alfort in Europe when you came to the School of Maison Alfort on the occasion of the Zurich Congress. I am the General Secretary of the Association that organized your reception at Maison Alfort. Unhappily, I had a long standing engagement with the Greek Government which asked me to come to Greece, and I could not be at Maison Alfort when you came there. I regret it very much, and I apologize here in public for that.

For me it is not only a great pleasure, but also a duty to receive our American guests. There are so many memories and so many relationships between our two democracies that it is a great pleasure and an honor to receive you in our School. I have not been in the States for a very long time, but I realize the activities of your profession. Some days ago I was at the club and I was happy to sit with some notables who belonged to it, including Dr. Mohler, who was a student at Maison Alfort, and was a student with the well known Locure. It proved how much all the world appreciates the work of the veterinary surgeons. You are
supporting the agriculture industry and you have always a social role which is very useful, because you make the agriculture stay in the country, and so you have a triple mission—scientific, economic, and social.

This way you exemplify very well the ideal of your great democracy, an ideal which we salute and with which we collaborate. So you support not only the interest of your own country but also of the world.

My dear colleagues, I salute you in the name of the French Veterinarians, in the name of the old School of Alfort and its former students. Some of them are the pioneers of the American teaching, and we will always honor their memory. I may say to Dr. Mohler that his name and the names of his collaborators are very much honored in France, just as much as we honor our own teachers.

In closing I salute you in the name of my Country, and thank you for all the sympathy you have for us in allowing us to come here, and I address to you all my felicitations and salutations.

SECRETARY MERILLAT: You have heard Professor Letard, who, as Dr. John R. Mohler has told you, is professor of zootechnics in the Veterinary School of Alfort. I think our Association here is very happy to have a character such as Professor Letard to take time out from his regular duties here to come down and address us. (Applause.)

PRESIDENT AXBY: I want to thank Dr. Mohler on behalf of the Association for his response, as well as his and Dr. Merillat’s providing this wonderful privilege of having Dr. Letard with us today.

In the natural course of events, the next item on the program is the Address of the President.

ADDRESS OF THE PRESIDENT

By J. L. Axby, Director, Live Stock Sanitary Service,
Indianapolis, Indiana

Members of the Association, Visitors, Guests, and Friends:

One year ago you elected me your president. I said, at that time, I would in my humble way do the best I could,
but the thing I most desired to make the Association and its work a success, was your co-operation.

Today, I am happy beyond words to express. Every appointment and every assignment was accepted—by some, with reservations—but, by so many, with expression of friendship, that I felt and still feel happy plum' through.

In all sincerity, may I say to you that I have ever been mindful of your confidence and trust, and shall ever be grateful for the honor of presiding over and making directing recommendations to the greatest Live Stock Sanitary Association in the world.

To the various committee chairmen and their respective committee members, I do here and now say: “Thank you; thank you a lot,” and wish it coincidental with a handshake of Hoosier friendliness and hospitality.

The literary program needs no recommendation nor explanation. To survey it means only a desire to hear it and enjoy it.

The past year was not without its casualties, one of which very directly affected this Association. That was the unexpected death of L. Enos Day, secretary-treasurer. I attended his funeral and stayed over until everything that could be accomplished by way of collecting and organizing the belongings of the Association was completed.

Difficulties confronted me to such an extent that I realized that some one had to be placed in authority to safeguard and conserve the belongings and best interests of the Association.

For the purpose of determining the proper procedure in filling the vacancy, I consulted our Constitution and By-Laws, and found it inadequate to the occasion. I then exercised the inherent rights of possession of the President's gavel, and appointed Dr. L. A. Merillat, secretary-treasurer of the Association, to serve the unexpired term of the late L. Enos Day. I hope this appointment met with your approval.
L. A. Merillat has been more than adequate to the occasion, and I trust the Association gives him the recognition which he has so justly and deservedly earned, in this Association emergency.

Whomever the Executive Committee sees fit to elect secretary-treasurer this year will find the foundation laid for an orderly filing of all Association records in a filing cabinet of our own. This will make it possible to transact business in an orderly way and safeguard for future history and posterity all written proceedings of the Association.

An investigation of the Office of the Secretary-Treasurer will confirm the above relative statements.

We are living in a wonderful era and in a country of peace—peace at home and with the world. Far be it from me to hector or complain of any state or nation that breaks precedent in proclaiming what date shall be Thanksgiving Day, for we as citizens of these United States should consider every day of peace a Thanksgiving Day and emulate the precepts of the man from Galilee and practice the fundamentals of our present education. In so doing we would peacefully solve our sanitary problems, which, if universally practiced, would solve our world problems.

During every decade, if not each year, new problems arise, characterized by an ever increasingly complexity. We, of this Association, should not lose sight of the fact that we represent the live stock industry of North America. The stand we take and the recommendations we make must be beneficial to the most. We should ever hope to be fair to the least of the units comprising the whole, and work for a uniformity of relationship and interchange so simple and fair that no reason could exist for camouflaged trade barriers for want of equality in all problems of disease prevention, control, and eradication.

It has been our privilege to observe the commendable work of the Bureau of Animal Industry, United States Department of Agriculture. The co-operation it has given the respective
states has been of great benefit in the work done in their respective field of operation. The Bureau is under civil service, and its progress and enviable status can be very greatly attributed to that class of service. I am firmly convinced that the respective states could better serve the live stock industry and better safeguard live stock and public health programs by legalizing real civil service systems under which their live stock sanitary and disease control officials might be placed.

I shall not refer to tuberculosis, Texas fever, foot and mouth disease, sheep and cattle scabies, contagious pleuropneumonia, anthrax, and other diseases which have so gravely and acutely concerned us in the past. The ends hoped for in regard to these diseases have been pretty generally attained.

**Bang's Disease**

However, Bang's disease does not occupy a comparable satisfactory status in the opinion of live stock breeders and live stock sanitarians.

To me, in terms of actual veterinary practice, and as chief sanitary officer of a state, I am inclined to think it is possible to eradicate Bang's disease, and it should be done. Extenuating circumstances do exist, but certainly some policy can be devised commensurate with facts and finances. Time is a factor. Eventually flexibility of policy will convince the most arbitrary and skeptical that temporizing with contagious and infectious disease is more troublesome, more costly, and uncertain than definite eradication policies.

**Enteric Diseases of Swine**

I recommend more extensive experiment and research in the serious enteric diseases of swine, and hope that the day soon comes when sale barns will have qualified supervision. We need requirements which will prevent the sale of sorted hogs from herds in which contagious and infectious disease exist, unless said sale be for immediate slaughter, and at establishments under veterinary supervision.
Rabies

Rabies is a serious problem; and this Association should go on record with statements, suggestions, and advice that could be used in educating legislators, and assure them of their being right in their legal enactment requirements when the incontrovertable facts are given to them.

May I call to your attention that the official body of this Association is the Executive Committee, consisting of representatives of the live stock sanitary control divisions of the respective states, the Bureau of Animal Industry, and of Mexico and Canada. Behind all this collective assemblage and activity is the idea of how to co-operate advantageously to prevent the transmitting of infectious disease from one area to another, and by education to teach live stock owners, individually and collectively, to promote and enhance trade in healthy live stock.

Today, we are confronted with a great tendency to prohibit the inter-state shipment of dairy products because of unfair regulations at the destination. I recognize the complexities of such cases, and many of the causes for it, and to abate many reasons for these regulations, I recommend trained veterinarians for dairy inspectors. It would also be valuable to have the chief sanitary officer of the respective states, ex-officio or otherwise, as a member of the State Board of Health and a consultant sanitary officer for all milk control agencies. This would tend toward a better common understanding, a greater uniformity of laws, rules, and regulations, and better safeguard against unwholesome dairy products at home or in inter-state shipment.

My observations cause me to believe ways and means should be devised to disseminate known knowledge of external and internal parasites. This should be done by every known means—again and again.

In the last six years, I have used the radio to tell the story of how to have healthy live stock and owner happiness and pride.
My telephone and mail following these broadcasts prove that the farmer listeners, their wives, and their boys and girls are interested and receptive, ever eager and waiting for practical, applicable information.

As time marches on, we must look well to our qualifications and be adequate to the demands of a rapidly increasing poultry industry.

I have already made reference to the program for this meeting—the forty-third annual convention. I sincerely want it to be a good meeting. I am sure this wish will be fulfilled. To all of those appearing on the program, I am indeed grateful and proud to be associated with you, as all will be who hear you or read your work in the years to come.

In conclusion, may I say, I believe in the destiny of the United States Live Stock Sanitary Association. I believe agriculture to be the fundamental, basic activity of the land. I believe the live stock industry is the keystone of the arch of agriculture, and that, if the live stock industry is to be profitable, it must be healthy.

I have faith in the future of our Association—the same faith which has been the essence of the American spirit.

I refuse to entertain any suggestion of surrender to the demands of difficult circumstances.

I believe we have the inherent ability to solve our problems with justice and fairness to all in the prevention, control, and eradication of all contagious and infectious diseases, and to develop a greater union, composed of a galaxy of healthy states, each working for all, and all for each.

The signboard of charity, education, fraternity, and service points the way.

We must not, we will not, lose our sense of direction, and, with uniformity and unity of purpose and action, we will obtain satisfaction, health and happiness.

(Applause.)
SOME RELATIONS OF KIDNEY PHYSIOLOGY TO THE DIAGNOSIS OF KIDNEY DISEASE


The subject which your Secretary-Treasurer asked me to discuss this morning was originally prepared for a little group of veterinarians who were continuing their education. At the time I first prepared it, knowing as I did that it contained nothing radically new and that it was all prepared from the standpoint of knowledge of human disease alone, I wondered how veterinarians could be very interested in it. However, groups of veterinarians have since asked me to present the discussion, and that is how I happen to be here today.

Most of these things that I will discuss are simple fundamentals. I hope if the discussion is old to you that you will not blame me. Remember your Secretary invited me to come.

It is necessary to go down to a small microscopic unit which is the fundamental unit of the kidney when considering the physiology of this organ. There are billions of these microscopic units in the kidneys of mammals and they are all essentially the same. I have prepared a diagram which shows the fundamentals of this kidney unit. (Slide used here.)

Up at the top where it is blurred you will see this network is intended to represent capillary blood vessels. The blood enters through a little artery, passes through the capillaries

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*Mr. Watrous's talk was illustrated with lantern slides, and was prepared from that standpoint, hence the numerous references to diagrams and illustrative material that isn't present in this publication.
and then continues on its way up here and out. The network of the capillaries above that little funnel is intended to represent the vacuolar structure of the glomerulus. The funnel is a schematic representation of the thin hollow space which surrounds the network of capillary units. The filtrate from the blood comes down through that space and enters the convoluted tubule system. I am sure you all remember the two sets of convoluted tubules, known as proximal and distal. This is the proximal set. Then the filtration goes through the descending part of Henle's loop, through the ascending part of the same loop, and into the distal convoluted tubules.

The purpose of all this mechanism is to produce a filtrate from the blood, and when we examine how this is done we encounter a number of theories. I do not want to take up your time by going into all these, but I will just take one and call to your attention the fact that these theories have never been studied experimentally on the mammalian kidneys. The reason for this is that the structure of the mammalians' kidneys is so fine that small enough instruments cannot be inserted in the kidney while it is in the living condition. All the experimental evidence is based upon work on amphibian kidneys in which the cells and structure are much larger. In the amphibian kidney it is actually possible to insert very fine tubes into this loop and withdraw samples of the filtrate large enough to analyze.

As the blood enters up in this upper left, it is under the same pressure as the arterial blood which is rather high. As it comes through the constricted portions of this little filter, it undergoes a great drop in pressure, and acts as an outward force pushing fluid through those fine capillary walls. The walls are really the center or essence of the filtration process. They are paper-thin walls which will allow water to pass, but will not allow larger molecules to pass through them.

The filtrate that comes out of that little filter in the mammal, and its composition is unknown for the reasons I have
stated. In the amphibians on which the experiments have been made this filter has been found to be essentially of the same composition as the blood serum would be without the protein in it. The concentration of salt, sugar, urea, etc., in that filtrate is essentially the same as in the blood.

Now we all know that in the final product the urine does not have the composition of the blood. Somewhere in this mechanism a great change must take place in the filtrate. So we come to the second aspect of urinary formation, which in one theory is known as resorption. The fluid, after being filtered, passes through a complicated series of tubules. The very presence of those tubules would seem to indicate that they must have some function. According to one theory, they are there to withdraw water from the filtrate, and thus leaving it much more concentrated than it originally was. Just what materials are withdrawn in this set of tubules, and what in this other set, is a question which cannot be settled. But it is certain that the urine is more than just a simple filtrate. It usually contains less water and salt than the blood. It contains less sugar and certainly much less protein than the blood, but on the other hand it contains more of the nitrogenous waste products of urea, creatinine, and uric acid, than does the blood. Furthermore, the urine in general has a different reaction with respect to the acid base than the blood. On further study it will be found that this indicated one of the important functions of the kidney—to maintain the acid base equilibrium of the blood.

This tubule system in which resorption occurs treats different substances differently, and the action in general is for the benefit of the body. If there was too much water present in the body, then the urine will be more dilute in the end. If there is not enough water, it will be more concentrated. If there is too much urea in the blood there will be more urea in the urine. If there is too much of the number of acidines in the blood, there will be more acidines in the urine.
That brings us to the so-called threshold idea; namely, that the cells which make up these fine tubes have what is called a threshold for different substances. Or, we might say, substances are divided into threshold and non-threshold substances. We all know there is sugar in the blood. Yet normally there should be no sugar in the urine. Further, we know that if the level of sugar in the blood rises above a certain level, which we call the threshold, then some will appear in the urine. The same is true of a number of other substances.

Now let us consider some of the services rendered by the kidneys. We all know that kidneys are vital organs. They are necessary for the continuation of life, and as befit vital organs they have an enormous reserve capacity. One kidney can be completely removed and the animal can survive. One of the ways in which this reserve capacity works has actually been observed under the microscope. It is believed that all of these little units, such as we have schematically represented here, act only in rotation, one at a time. Or, we might say that ten per cent of all of them act at one time, and in the unit itself I have shown only four of these little capillary loops, but there would actually be around twenty of these little capillary loops. They apparently do not all work at the same time. Perhaps only five or ten of them in one unit would be working at one time. Then they would squeeze down in order to take over their work, so that only part of the kidney works and only part of the time.

One of the most important functions of the kidney is the maintenance of water balance. An animal takes in over the course of a month nearly its own weight in water. The results are quickly apparent. If anything goes wrong with the elimination of that water, the animal gains weight, the water accumulates in the tissues, and all of the functions begin to suffer. Probably an even more important function of the kidney is the elimination or regulation of acid ions. Death can result very quickly from the accumulation of ions either of acoline acid or a basic nature.
We know that if the kidney function stops as it sometimes does, producing the state of urem, death quickly follows, and I think it is a common misconception that the death is due to the accumulation of urea in the blood. As a matter of fact, urea is not very toxic, and death in uremia probably occurs from the disturbance of the acid balance. Nevertheless, the elimination of nitrogenous waste is another important function of the kidneys. These materials are the by-products of the burning of protein, and the body can only use a certain percentage of them, and the rest must be eliminated.

That is a short review of the physiology of the kidney, and it allows us to consider what happens when this very delicate piece of machinery is upset. We should consider the agents which can cause injury. First are poisons such as heavy metals, mercury, and vegetable toxins. Next there are the bacteria toxins, especially those arising from the streptococci. There is another way in which bacteria toxins can cause a very special injury to the kidney which produces a special manifestation that I will talk about later. It is thought possible that the cells of a kidney may become sensitized to certain bacterial toxins which are not present in large enough amounts actually to damage the cells, but having become sensitized the cells display a peculiar reaction whereby the thin epithelium of the capillaries becomes permeable to the proteins of the blood and an enormous loss of protein occurs in the urine.

Then, of course, there is direct bacterial invasion of the kidney such as we would see in abscesses affecting either the cortex or in pyogenic invasion of the pelvis of the kidney as in pyelitis. A third source of injury is vascular disturbance, such a change as would usually be seen in old age. That is a very interesting effect. You might think that any blocking of the blood supply here would manifest itself only on the filter. Actually, as you can see, I have drawn the extension of the blood supply to come down past these tubules. Now it is in a much more intimate connection than the tubules of this diagram would indicate and when the
blood supply of any one glomerulus suffers, the associated tubules also suffer and will show degenerated changes.

Probably the most serious vascular disturbance and the most common is a slow thickening of the little arterial unit which might supply three or four hundred of these units. That is a senile change in which the lining of the artery grows so large that it obstructs the flow of blood and results in a gradual destruction of the kidney unit.

Another cause of injury to the kidney arises when the outflow of urine is blocked. As soon as the pressure builds up enough in the urine containing part of the kidney, the secretion of urine is interfered with and if this condition is allowed to persist, the whole kidney may become a large cyst and all of the functional parts of it be destroyed.

Now what happens? What are the results of these different types of injury? Let us take the result of an acute injury such as we would have from a bad poison or from an overwhelming onslaught of bacterial toxin. One of the first responses of the kidney is to swell up. All of the cells are injured, and they respond by taking in more water and swelling up. There is a tight capsule around the kidney which restrains all of the elements inside. The pressure builds up to such a point that the blood can no longer circulate through the kidney. The result is no blood, no filtration and no urine.

When the kidney ceases to function temporarily, immediately results appear. You could forecast these results from your knowledge of the action of the kidney. One of the first things to occur is an upset in the acid base balance, and this results in a peculiar effect on the tissues. You all know that acute kidney disease in a man, and, I suppose in an animal, will cause a peculiar puffing and swelling of the tissues. This is due apparently to an upset in the acid base balance, and not to any circulatory disturbance such as many types of swellings are. Immediately when this upset condition occurs, the patient becomes very ill and if the condition
is not corrected or if it does not correct itself spontaneously, death can be expected in a short time.

When the acid base balance is upset any water taken in will be retained, because there is no other way for it to get out, and the concentration of urea, uric acid, and creatin will rise in the blood. This is probably only significant as a sign or a measure of how severe the failure of a kidney is, but it is a valuable sign. Now let us suppose that the kidney does not swell up quite so seriously that all the urine stops, yet it suffers severe damage. Then what do we expect to find? One of the things which suffers most severely from the toxins or poisons is the filtering unit. The capillaries which make it up are adversely affected, and become much more permeable than they would normally be. Instead of merely allowing water and certain salts to pass through, they allow serum, the protein part of the blood, and even some red blood cells to escape, and those appear in the urine. That is why, of course, we find the red cells and the albumin in the urine.

Now in an acute process like this, it can either continue and cause death or it can subside. If it subsides there will always be some permanent damage to the kidney. A few of the functioning units will be destroyed and not replaced, and the reserve of the kidney is diminished by any given attack. Suppose the animal becomes affected again and again with the same organism that caused this damage, or suppose the animal is poisoned again and again with the same poison. These repeated acute injuries will finally lead to so great a loss of function that the kidney can no longer carry on its work and all of the symptoms of chronic kidney failure will appear.

Let us suppose that this certain special thing happened that I spoke of awhile ago. After one attack, say an attack of streptococcic infection, the animal recovered but the kidney cells became allergic to this streptococcic toxin. Suppose that the animal becomes affected again with the same organism. This is the theory held by a few physicians,
and it explains a number of things. They postulate that when the second infection occurs, a small amount of these toxins get into the blood and you have a reaction in the functioning unit, the glomerulus, which is analogous to hives or hay-fever or many other allergic phenomena. The permeability of the capillaries become greatly altered, and they allow albumin to pass through freely. However, they do not allow any red cells to pass. The result is a tremendous excretion of albumin in the urine, what has been known as necrosis. There is no actual bacteria attack on the kidney, so you cannot speak of an inflammation, and that is why we have the ending of "osis" rather than "itis."

The continued loss of albumin in such a condition leads to a diminution in the osmotic pressure of the blood. In other words, the blood is no longer able to hold within itself and within the veins and arteries the water which makes it up. Such water will escape into the tissues and the result is a massive swelling or edema of the whole body which is a characteristic finding in necrosis. The usual course of such a disease is continued loss of albumin up to the point where repeated onslaughts to the kidney diminish gradually the number of units that are working. Finally, there would not be enough units working to eliminate even the albumin. Then suddenly there will appear to be an improvement. There will not be so much albumin. The diet will make up the loss and the patient is no longer swollen up and everyone thinks he is getting better. Actually it is just about that time that the kidney function has become small enough so he begins to retain urea and creatin and the other waste products, and is on the verge of uremea from which nothing can save him.

When a chronic injury to the kidney has taken place we have a well known combination of symptoms. As the number of units in the kidney decreases, those that are left have to work that much harder to do their work. Finally, the point is reached where the kidney is working night and day, and even then is just barely keeping up. All of the kidney is being used, and urine will accumulate even when the
animal is resting or sleeping as fast as it does when the animal is awake. When the animal is awake its blood pressure tends to be higher and more urine tends to be filtered. When at rest, the normal animal does not filter so much urine. The animal, with chronic injury filters just as much when resting as when up and around.

To make up for the deficiency in the kidney, it seems as though the heart tries to pump more blood through the kidney hoping to get more filtration that way, and with that extra blood pumping comes a rising blood pressure. That is another common symptom of this disorder.

At the same time, the urine in the normal animal may vary in specific gravity from almost zero to 1.030, gradually approaches a fixed value. The kidney can no longer either dilute or concentrate the urine. Finally, in some cases, the specific gravity is absolutely fixed. It does not make any difference whether the animal drinks a lot of water, or does not drink any water. The urine will still have the same concentration.

In diagnosis of kidney diseases, I realize that people working with animals cannot employ all the refined methods that are employed with men. Nevertheless, if the kidneys are functioning properly, it can be shown by a few simple things. It is always possible to measure the intake of water, and sometimes it is possible to measure the output. These should balance in a normal animal. Something is wrong if they do not balance. Another simple thing is the gross examination of urine. A great deal can be told from that. I need only mention that the urine in chronic kidney disease with fixed specific gravity has a pale color. No matter what time of day or night it is taken, it is always the same pale color, and does not show anything else wrong.

You are probably familiar with the appearance of the urine in acute nephritis. It is a dark muddy color that has more of a tendency to foam the albumin. Then you have a very useful test which can be applied to measure the function of a kidney. I believe this could be applied to animals
very easily. I have told you that as a kidney is progressively destroyed, its ability to concentrate is lost. Now all you have to do to put the kidney on its best behavior, so to speak, is to withhold water. If you withhold water for thirty-six hours, and the urine fails to reach a concentrate of at least 1.025, you know that the kidney function is damaged, and the closer the specific gravity becomes to 1.014, or thereabouts, on withholding water, the more damage there is.

Some veterinarians do microscopic examinations of the urine, and I think from what we have discussed this morning you can all see that the explanation of albumin, red cells in the urine, is not difficult. You can really visualize the pathology that must be present in the kidney when you see those elements in the urine.

Now just a word about one other thing you may see under the microscope—casts. What are they? They apparently are nothing but precipitated albumin, and you will see them only in acid urine. Even though there is albumin present, it will not precipitate in an alkaline urine. The precipitation apparently takes place somewhere in this tubule system, and the casts take on a tubular form. Little else besides albumin is present when they are clear and transparent. If they have many dark course granules in them, those are just the remains of red cells.

I cannot discuss kidney diseases which are peculiar to various domestic animals, as I am completely ignorant of those. However, from the physiological basis of diseases, we all speak on common grounds, and it is from here that we hope important strides forward will be taken. (Applause.)

PRESIDENT AXBY: Thank you, Mr. Watrous. I am sure that everyone will admit that it was mighty nice of Mr. Watrous to come here and present a feature of this nature. It was very illuminating and educational.

PRESIDENT AXBY: The next item on the program is the Secretary-Treasurer’s Report.

SECRETARY MERILLAT: I shall make that report, the regular report, to the Executive Committee. There is nothing of particular
interest to report here at this time except what the President has already told you. I was invited by President Axby at the interment of our late lamented L. Enos Day, to carry on the functions of that office, and proceeded immediately to take over the affairs and carry them out to our best advantage. Certain difficulties were encountered which will be reported to the Executive Board and brought back for your consideration.

We have a good functioning office set up in the Office of the American Veterinary Medical Association, which I shall be proud to turn over to my successor. Thank you.

PRESIDENT AXBY: Try to be here at one-thirty, and we will start off promptly at that time. We will stand adjourned, if no one has anything of importance to bring before the Association, until one-thirty o'clock.

The meeting adjourned at 12:05 p.m.

WEDNESDAY AFTERNOON SESSION,
DECEMBER 6, 1939

The meeting convened at 1:40 o'clock, President Axby, presiding.

PRESIDENT AXBY: Gentlemen, will you please come to order. The first item of this afternoon's "Bang's Disease Session" is "The Present Status of the Federal-State Bang's Disease Program," by A. E. Wight, chief, Tuberculosis Eradication Division, Bureau of Animal Industry, United States Department of Agriculture, Washington, District of Columbia. It is my pleasure to present to you Dr. Wight. (Applause.)

THE PRESENT STATUS OF THE FEDERAL-STATE BANG'S DISEASE PROGRAM

By Dr. A. E. WIGHT, Chief, Tuberculosis Eradication Division, Bureau of Animal Industry, United States Department of Agriculture

At the meeting of the Association one year ago, there was considerable interest in the minds of many of the workers in connection with the control and eradication of Bang's disease in cattle as to what would be the effect on the work after May 1 of this year, when it was no longer possible for the
Federal Government to make an indemnity payment except in cooperation with the States. The legislatures in all but four of the states have convened since December of last year. A total of approximately $3,500,000 has been made available by the states for Bang's disease indemnity for a period of one year beginning July 1, 1939. Provisions for indemnity have been made in all states except California, Colorado, Indiana, Kentucky, Massachusetts, Mississippi, Missouri, Nevada, New Jersey, Oklahoma, South Carolina, South Dakota, and Texas. While it was hoped that the indemnity funds would be provided in all the states where there was very much interest in the Bang's disease work, it is gratifying to know that favorable action regarding indemnity has been taken in 35 states. The legislatures of seven states will convene again next month, and in one state the legislature will convene in May of next year. Therefore, consideration will be given to appropriations for Bang's disease work in at least eight states next year. In the states that are providing indemnity, arrangements have also been made to have funds available for the year beginning July 1, 1940.

The volume of work in connection with the testing of cattle for Bang's disease, where the reactors have been eliminated, was about the same as during the previous year, although the degree of infection was lower. During the fiscal year 1938 the degree of infection was about 4 per cent, whereas the following year it was 3 per cent. Many of the tests, however, were retests, a fact which accounts for the low percentage of infection contained in the complete report covering approximately 7,600,000 cattle, located in about 725,000 herds. Of the cattle tested, 219,165 were classified as reactors. On November 1 of this year, there were approximately 11,400,000 cattle under supervision in the Bang's disease project, and these animals were contained in about 1,500,000 herds. This is an increase of approximately 14 per cent in the number of cattle and 30 per cent in the number of herds as compared with the report issued at the end of October, 1938. The following table shows the per cent of dairy and breeding cattle over 6 months of age under
supervision in the Bang's disease project on November 1, 1939:

In the United States .............. about 21 per cent.
In 7 States ...................... more than 50 per cent.
In 13 States ...................... 26 to 50 per cent.
In 15 States ...................... 10 to 25 per cent.
In 13 States ...................... less than 10 per cent.

Federal Funds

The amount of Federal funds made available for Bang's disease work during the fiscal year ending June 30, 1940, is considered ample to carry on the Federal part of the work during this fiscal year. This amount is for operating expenses and indemnity, and no indemnity payment can exceed the amount paid by the cooperating state or other agency.

Payments to Owners for Bang's Disease Reactors

The average Federal payment made to owners of cattle that react to the test for Bang's disease is, at this time, approximately $15.50, while the average state payment is $17.65. The salvage received by the owner of these cattle amounts to an average of approximately $34.00 per head, and the average present appraisal is about $93.00. Approximately 11 per cent of the reactors are registered pure bred cattle.

Methods Followed in Conducting Bang’s Disease Work

The Bang’s disease work continues to be conducted under the individual herd plan and also on the area basis. As far as the Federal Government is concerned, Bang's disease is voluntary on the part of the owner. However, during the last year work has been conducted on an area basis, which provides that all dairy and breeding cattle over 6 months of age in the area are to be tested and the reactors removed. Under the area plan about 2,600,000 agglutination blood tests, including retests, were made during the last year, or
an average of about 220,000 per month. The number of reactors disclosed was approximately 42,000, or a little less than 2 per cent. The initial testing of all cattle in a county has been or is being conducted in about 490 counties in 24 states, and up to November 1 of this year the initial test had been completed in about 400 of these counties in 19 states, showing an average cattle infection of 2.7 per cent. The percentage of infected herds in the areas where the initial testing has been completed was found to be 5.2 per cent. In all the herds showing any reactors, it is necessary to conduct retests one or more times in order to remove any additional reactors that may be in these herds. The herds containing suspects without any reactors are also retested one or more times. Retests of all cattle have been completed in 70 of the 400 counties, and reports indicate that the average infection found was about 0.8 of 1 per cent.

A portable laboratory in which the blood samples can be tested has been provided for use in each of six different states, and these have proved to be very satisfactory.

All of the antigen used in making the tests for Bang's disease in official work is now furnished by the Bureau of Animal Industry and has been since about July 1 of this year. This has proved to be a very important action and provisions have been made to have all the antigen for private use prepared according to the methods followed in making the Bureau antigen. When this is accomplished, a higher degree of uniformity should result.

Retests of Suspects

The records maintained by the Bureau of Animal Industry, which are prepared as a result of work in the field in connection with the retesting of suspects in herds of cattle containing reactors, indicate that the percentage of suspects later classified as reactors remains about the same each year. The following report covering the period from July 1, 1937, to September 30, 1939, presents the results up to that time:
GROUP 1—SUSPECTS TO ONE TEST

Number of suspects retested: 120,158

Results: Number Per Cent
Negative to retest . . . 60,434 50.8
Continued suspects . . 30,194 25.1
Positive to retest . . . 29,530 24.6

GROUP 2—SUSPECTS TO TWO TESTS

Number of suspects retested: 24,440

Results: Number Per Cent
Negative to retest . . . 10,600 43.4
Continued suspects . . 8,692 35.6
Positive to retest . . . 5,148 21.0

GROUP 3—SUSPECTS TO MORE THAN TWO TESTS

Number of suspects retested: 24,085

Results: Number Per Cent
Negative to retest . . . 9,852 40.9
Continued suspects . . 8,867 34.7
Positive to retest . . . 5,867 24.4

Studies of Vaccination

Further studies in the immunization of cattle against Bang’s disease, or brucellosis, have been conducted during the last year at the Animal Disease Station of the Bureau as well as in several of the state agricultural experiment stations. The results of these controlled experiments continue to indicate that the vaccination of calves from 4 to 8 months of age produces the best results. As indicated in previous reports on this subject made to this Association, the use of Brucella vaccine under field conditions is being studied. This activity has been continued in approximately 260 herds, containing about 19,000 cattle, located in 24 states. When the work was first taken up in these herds, Bang’s disease infection existed to 15 per cent or more. This study began in January, 1936, and since that time approximately 13,000 calves between the ages of 5 and 7 months have been immunized in these herds. Of this number approximately 2,950 have completed their first gestation, about 625 the second, and about 60 the third. The results thus far obtained
in connection with this study continue to be encouraging, but as yet there is not sufficient evidence available to formulate final conclusions. However, it is hoped that at the conclusion of another year a more detailed report will be available, which will make it possible to determine to some extent whether or not the immunization of calves against brucellosis is practical and feasible under field conditions.

The Results Show Progress

For a number of years, in most all of the states, some plan has been followed to have the herds of cattle that have passed the required number of negative tests for Bang's disease be certified. At this time there are about 55,000 such herds in the United States, containing approximately 1,100,000 cattle. Many more herds have passed the required number of tests to become certified, but such action was not taken.

In connection with the area work for Bang's disease, arrangements are being made to declare counties in a modified accredited status, indicating practical freedom from this disease. There are at this time in the neighborhood of 200 counties in 15 states where it has been demonstrated by actual testing of all the cattle that Bang's disease infection does not exceed 1 per cent of the cattle population and exists in not more than 5 per cent of the herds of cattle in those counties. The individual herd work has made it possible to eradicate this disease from many additional herds of cattle throughout the country where it has been taken up and thereby reduces the county-wide incidence of the disease among cattle. As a result of the work done by the Federal Government in Bang's disease eradication, the legislatures in three Southern States have provided sufficient funds to conduct cooperative work on the part of the state to a point where it should be possible to classify all counties as modified accredited areas. This condition is also true in the State of New Hampshire.
Publicity is Helpful

In order that the cattle owners may have as much information on the subject of Bang's disease as possible, it is believed important to have suitable literature available in all the states, and the Federal Government has distributed large numbers of copies of Farmers' Bulletin No. 1704 on this subject. This publication is now being revised in order to bring the information more up to date. Arrangements have also been made by the Bureau of Animal Industry to issue a publication on the general practical benefits of Bang's disease control and eradication. This will contain numerous excerpts from communications received from owners of cattle who have had their herds tested for this disease with good results. A poster, size 16" x 20", has also recently been prepared on the subject, and copies of it are being widely distributed. It has been possible also to furnish information on Bang's disease in cattle through the cooperation of the public press and the radio, both of which have been helpful to the advancement of the work in many sections of the country.

Conclusions

The fact that the owners of approximately 1,000,000 cattle now on the waiting list, located in many different states, desire to have the Bang's disease work taken up in their territory is positive evidence that there is much demand for the work in various parts of the country. The progress in this work, however, will necessarily depend to a great extent on the amount of funds made available by the Federal and State Governments. It is believed important that research work be continued in connection with the study of this disease both as to its nature and the possibility of developing a better method of immunization against it. Studies should also be made to determine whether it is feasible and desirable to adopt any plan that would include the immunization of young cattle, as well as the disposition of reactors that have not been vaccinated.

As usual it has been a great pleasure to appear on this program today before an audience which is so keenly inter-
ested in this subject. The action taken by the United States Live Stock Sanitary Association at this and future meetings will have an important bearing on the outcome of the project which we are discussing today.

PRESIDENT AXBY: I am sure we are all appreciative of Dr. Wight’s presentation of this broad picture of the present status of the Federal-State Bang’s disease program which is as large as the country to us. (Applause.)

PRESIDENT AXBY: The next speaker on “Bang’s Disease Control from the standpoint of the Animal Breeder,” is a gentleman who is actually in the business and who is president of the Arkansas Farm Bureau.

It is men of his calibre whom we must associate with and be big enough to lead safely and in accordance with the best discoveries and developments of scientific research. I am indeed proud to present to you, R. E. Short, president of the Arkansas Farm Bureau. (Applause.)

"BANG’S DISEASE CONTROL FROM THE STANDPOINT OF THE ANIMAL BREEDER"

By R. E. SHORT, President,
Arkansas Farm Bureau, Brinkley, Arkansas.

Mr. Chairman and Gentlemen: I certainly do want to express my deep appreciation for the privilege of appearing before this very important body to speak on a problem that means so much to the live stock industry of this country. When Dr. Stubbs asked me to appear on this program, I hesitated, for I did not want to pose as an expert on this subject.

I am happy, however, to come and share with you the practical experience I have had in my own operations which reflect the benefits that are being enjoyed by the cattle men of Arkansas. I would like to take this opportunity to express my deep appreciation to the Department of Agriculture and our own State Officials for the great service they have rendered to the live stock producers of our State in the eradication of the tick, and in the tuberculosis campaign.

The Bang’s Disease Program was launched in Arkansas in August, 1934. This program was conducted under a voluntary work plan until 1936. Up until that time quite a
number of herds had been free from the disease, but nothing
definitely had been accomplished. Counties were set aside
and compulsory testing was started in March, 1936. Almost
immediately the percentage of infection began to show a
reduction. Since that time there has been approximately
190,000 herd tests conducted under the compulsory plan in
54 counties, and the remaining 21 counties have had more or
less voluntary testing conducted.

The amount of infection in the 54 counties of compulsory
testing was from 1 per cent to as high as 15 per cent. This
infection has been reduced to approximately one per cent in
each county.

I carry on two types of live stock work with cattle. I
maintain a breeding herd of from 80 to 150 cows, and also
carry on some range work, what I call steer grazing on my
pasture. It is not on the open range. All of my cattle are
maintained under my own fence.

In late 1934, I purchased a herd of cattle from a neighbor,
and before getting them on the farm I became suspicious
that they might be infected with Bang's disease, so I
segregated them. I placed them in a pasture and asked that
they be tested immediately. My original herd I felt was
free from Bang's disease up until that time. In the original
test, 123 head showed negative, 55 suspects, and 25 reactors.
The next test was on July 9, 1935. One hundred and eleven
showed negatives, 16 suspects, and 42 reactors. October
3, 1935, 152 negative, 2 suspects, and 12 reactors.

I took on this test, when I took off the reactors, I took
the suspects out too. In carrying on this test, the suspects
were segregated from the rest of the herd and kept in
separate pasture from the other cattle.

The next test was on December 10, 1935. All showed
negative except one reactor. In April, 1936, we had another
test which showed 153 negatives, 2 suspects, and 4 reactors.

When I buy cattle, I make every effort in the world to
keep them clean. If I am not positive and unless I have
certificates to show that the cattle come from a herd that
has had at least two clear tests, I keep them in a quarantine
pasture until they have been tested twice. This has been my practice up to the present. The 2 suspects and 4 reactors came from that pasture.

The next test was 161 negative, and 3 reactors. The next test, November, 1936, showed no suspects, and 7 reactors, out of 155. Again these three, had prior tests, and seven of them came out of the quarantine pasture. In April of '37, the second test, was all negative. October, '38, another test showed all negative.

I have not had a suspect or reactor show up in this herd except those that I have been forced, through my buying program, to keep until they have cleaned up in the quarantine pasture.

I cannot give you my calf percentage. It was considerably less than sixty per cent. My herd has cleaned-up since this work has been completed, and, in the spring of 1937, we had a 98 per cent calf crop. This spring, out of 110 breed cows, we had four barren heifers develop, which have since been removed from the farm. We have on the farm today, from the balance of those cows, 106 cows and 99 calves, which I submit as a very excellent percentage.

I could give other experiences, but as I am thoroughly familiar with my own operations, I ask your indulgence to recite the experiences that I have had. I have been very particular in sanitary measures, because I have had some experience with Bang's disease, particularly from the observation of my neighbors. I have found that it has been very disastrous to two of my best friends and associates, and I made it a point to use every precaution to help to prevent a similar fate on my farm.

Farmers of our State displayed alarm when funds to carry on this work were made contingent upon participation of the State, and we came to the support of Dr. Stubbs in getting State participation. My county is not one of the 54 counties in the State where it is compulsory at this time. I just told Dr. Stubbs that I hope within the near future it would be, because our farmers are very much concerned about it, and feel that it is a very important problem. We
believe the eradication program should get the cooperation of all the departments, particularly this group that has had such a great part in forming, and framing, and carrying into execution sanitary programs in this country. We believe that the program should be continued and feel that the sanitary requirements in connection with this program should be carried out by the farmers themselves.

I cannot conclude my brief statements without again expressing my gratitude to Dr. Stubbs, and Dr. Rice, who have been carrying on this work in our State. I also want to express on behalf of the Arkansas Farm Bureau and the National Organization. Our deep debt of gratitude to Dr. O. O. Wolf, of Kansas, who was largely responsible for our organization taking national interest in this program. I want to offer, on behalf of the farmers, our sincere cooperation in an effort to carry this program on to a successful conclusion. I hope that in the not too distant future, we can say that we have eradicated this dread disease.

I thank you.

PRESIDENT AXBY: We are indeed appreciative of hearing about Bang's Disease Control from a practical animal breeder. Thank you, Mr. Short.

PRESIDENT AXBY: The next subject matter under this session is titled, "Problems Arising in Bang's Disease Control in the Western States," by our own W. H. Hendricks, State Veterinarian of Salt Lake City, Utah. Dr. Hendricks. (Applause.)

DR. HENDRICKS: Mr. President, fellow veterinarians, members of the United States Live Stock Sanitary Association: I welcome the opportunity to appear before you and present some of the problems that we are faced with in controlling Bang's disease. Perhaps I could better state our case if I were to speak extemporaneously, and yet I fear that I would wander or take up too much time, and so I have written some of my thoughts with respect to this problem.

PROBLEMS ARISING IN BANG'S DISEASE CONTROL IN THE WESTERN STATES

DR. W. H. HENDRICKS, Utah State Veterinarian

I believe that anyone who is familiar with the Bang's Control Program will agree that there are numerous problems yet to be solved. This is particularly true in the
intermountain section or in the western range areas. It seems that the problems here are a little different than those in other sections of the country. While it is desirable to inaugurate a uniform program, up until the present time at least, all sections of the country have not agreed upon a uniform method of controlling Bang's disease. We have only to visit various parts of the United States and talk with those in charge of the programs or with the cattlemen in each section to find a rather wide difference of opinion. On the other hand we may read the various articles in print or listen in on the discussions at the veterinary or live stock meetings to learn that opinions and experiences differ somewhat with respect to what constitutes a sound scientific program in some cases, as contrasted with a sound practical program in other cases. Of course, we believe the Bang's Control Program should be as nearly uniform as possible. One of the fundamental responsibilities of the United States Live Stock Sanitary Association is to make the disease control and eradication programs uniform. It is our endeavor also to coordinate and unify the efforts of the various state live stock sanitary officials with those of the United States Bureau of Animal Industry.

In presenting this paper with respect to our problems in western range areas I should like to speak from the experiences we have had with the program in Utah and from the experiences of others in similar range areas. In Utah we have been cooperating with the Federal Government on the program of testing and elimination of reactors by the slaughter method. We have not been able to work on this program on an area basis but have tested individual herds and in a great many cases herds in small areas with the idea that we might eventually develop the program so that it could be carried out, as soon as it was felt practical, on an area basis. The work that has been done so far has given us an opportunity to learn the approximate percentage of infection in our counties and also to lay the ground work for a rather comprehensive control program, if it were found feasible and practical. The live stock industry in Utah, as
well as in other range areas in the intermountain west, is of necessity managed somewhat differently than in other sections of the United States. The reasons for this is that there are large areas in the mountain sections that can be used only for summer grazing for a few months out of the year. There are other areas that can be used only for fall and winter grazing, then there are small areas that are under cultivation and in these areas are the ranches and pastures. As a matter of fact in Utah there is only about three per cent of the total area of the State that is under cultivation. These cultivated areas are in the mountain valleys and in these valleys are located the small towns and communities, and the majority of the ranches. The farms are small in most cases and the live stock have to be grazed on the forest in the summer and moved to the public domain in the fall and winter. Some cattlemen have private grazing lands and are able to feed some of the breeding stock and the stocker cattle through the winter. In other cases these cattle have to be held around the ranches during the winter. It is here that they mingle with both the breeding herds and the dairy cattle.

In most instances dairy cattle are kept on the farms and ranches; and in the small towns these cattle are driven to pasture in the summer time. This makes it possible for the herds belonging to various individuals to mingle. In the summer time young dairy animals are quite frequently sent to the forest for summer grazing and there, of course, they have an opportunity to mingle with the range and semi-range cattle for a period of four to five months. After the cattle are brought down from the mountains in the fall they again have an opportunity to mingle in fields, in the feed yards, and around the ranches with the range cattle and with dairy herds. These practices are quite common and are necessary. They are, as you can see, conducive to the spread of Bang's disease and they constitute a problem in connection with our program of Bang's control. As a result of these practices our cattle are not always available for tests, and particularly for retests, frequently enough to free them from disease.
During the time that they are not available they have an opportunity to mix with untested or diseased animals. This problem makes our control program rather difficult and expensive.

A great many of the range cattlemen are not converted to the present program of testing and slaughtering reactor cattle. They feel that the program could be made more practical and less expensive to them. In order to get results it probably would be necessary to make the program compulsory, which would entail the expenditure of large sums of money to enforce the sanitary regulations. It would also mean a great deal of expense and inconvenience on the part of cattle owners in the handling of their herds, because it is quite impossible to keep tested animals apart from untested animals. We do not believe it is advisable, at the present time, to make the program compulsory. Even though the program were placed on a compulsory basis it would be difficult to get results by working with cattlemen who would have a resentful attitude and who consequently would not cooperate on the program. We know that more educational work will have to be done with the live stock men, and even then the program will have to be presented to them on a basis that is practical and that will permit them to comply with its requirements.

In our work on the program that has been carried on so far we have had an opportunity to demonstrate, in a great many cases, the advantages of the program which has been carried on with cattle owners who could comply with its requirements. The problem herds, however, and in our section there are many of them, are not able to be handled under the present program. We realize that in order to make progress the attitude of the cattle owners must be favorable to the program so that we can get contacting herds tested and also get compliance with sanitary rules and regulations. It is very necessary that we also are in a position to control the replacements and additions that are made to the tested or clean herds. Certainly the cooperation of the cattlemen is necessary to accomplish this.
Presuming that it was felt advisable to carry out a program on a compulsory basis, a situation would arise in our case whereby a percentage of cattle owners would resent having to be forced to test. This would constitute a definite obstacle to the success of the program because it would be difficult, under our range conditions, to get the necessary compliance with sanitary rules and regulations. The success of our program in Utah in the future, therefore, will necessarily depend upon our finding some solution to the various problems that have arisen so that we may make the program practical in our section and thereby get the cooperation of the cattlemen.

When the program started many of our cattlemen were favorable and cooperated with us, but some of these men have since started to wonder if it is practical and economically sound for them to continue. One of the reasons is that in many cases a rather high percentage of reactors have been removed from their herds and these herds, in many cases, continue to show rather a high percentage of reactors. Another reason is that it is very difficult to handle the cattle often enough to get the frequent retests that are necessary in order to clean up the herd. There is quite a difficult problem, in many cases, in getting negative animals for herd replacements. Probably one of the chief difficulties is that of keeping the herds clean after they are tested and reactors removed. You can appreciate this problem in view of the way the herds mingle on the ranges, pastures, ranches, etc. These are some of the reasons why our cattlemen feel that perhaps the program is expensive and impractical. Of course, this problem may be more pertinent to our section than to other sections of the country.

We do have, on the other hand, quite a number of our dairy men and quite a number of the range cattlemen, particularly those who breed pure bred cattle and those who can control the grazing of their herds, who were favorable to the program and are still cooperating. These men have made it possible for us to carry the program to its present status.
We started the program in 1934, and following the cattle reduction part of the program we instituted the disease control feature of it. Unfortunately the idea still prevails with some cattlemen that the program is merely one of reducing surplus cattle and some of them still like to use the program for that purpose only. In spite of this we have made some progress under the present test and slaughter method. As a matter of fact when the work started in 1934, we had many herds that showed anywhere from 40% to 75% infection. During the first year the testing done indicated an average of about 18% to 20% infection. Of course, this testing was done in herds that were either known to be infected or herds where infection was suspected. As this program progressed the average percentage of infection dropped.

I am presenting a table here which indicates the progress of the work from July 1, 1934 up until October 31, 1939. I have indicated this by years and the figures will show the number of herds and the number of animals tested. These tests were made in practically all of our twenty-nine counties. Of course, in some cases that represents retests, while in other cases it indicates new herds added to the list during each year's work.

## PURE BRED CATTLE TESTED

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<td>June 10, 1936</td>
<td>28,190</td>
<td>6.24</td>
<td>56,945</td>
<td>6.61</td>
<td>94,871</td>
<td>6.8</td>
</tr>
<tr>
<td>Jan. 1-Nov. 30, '37</td>
<td>18,256</td>
<td>5.4</td>
<td>37,313</td>
<td>4.8</td>
<td>61,160</td>
<td>5.1</td>
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<tr>
<td>Jan. 1-Dec. 31, '38</td>
<td>17,440</td>
<td>5.7</td>
<td>44,677</td>
<td>5.1</td>
<td>67,299</td>
<td>5.2</td>
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<tr>
<td>Jan. 1-Oct. 31, '39</td>
<td>7,626</td>
<td>5.4</td>
<td>30,938</td>
<td>4.4</td>
<td>41,968</td>
<td>4.5</td>
</tr>
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</table>
The above table brings out a point that I wish to call to your attention. I have segregated it so that it indicates pure bred cattle tested as compared with grade cattle tested. I have further compared the pure bred dairy cattle with the pure bred range cattle. I have also compared the grade range cattle tested with the grade dairy cattle tested. The information we obtained shows a consistently higher percentage of infection in the pure bred range cattle than in the pure bred dairy cattle. While the comparison in the grade range and grade dairy cattle is not so striking, there is still a little higher percentage of infection indicated in the grade range cattle than in the grade dairy cattle. However, these percentages are more nearly uniform.

The point I wish to stress here is that our pure bred range cattle which, in a lot of cases are those around the ranches and pastures, carry a higher percentage of infection than do the cattle that are on the open range, or the dairy cattle that are more closely supervised. We do, therefore, see a necessity of doing more work in the breeding herds, and particularly the pure bred range herds, than we do with those on the open range.

We have approximately one-half million cattle in Utah. About one hundred fifty thousand of these are classified as dairy cattle. The balance are classified as range or semi-range cattle. Quite a large number of the dairy cattle, particularly the young animals, are handled in the same manner as semi-range cattle. Our problem, therefore, is intensified with respect to the percentage of our total cattle population that must fit into the Bang's program, under range and semi-range conditions.

Under the present program we have tested, during the period from July 1, 1934 to September 30, 1939, a total of 39,372 herds. In these herds are a total of 303,388 head of cattle. These figures do not represent all initial tests because some herds, during this period of time, have been retested two or three times. We found 7,148 of the 39,372 herds to be infected. This indicates that approximately 18% of the
herds are infected. There were 119,510 animals represented in these infected herds, or about 39% of the animals that reacted; keeping in mind, of course, that in some cases the tests were retests.

When the work first started some herds carried a very high percentage of infection but in most cases these have been reduced to a much lower percentage, particularly in the herds where we have been able to maintain the cooperation of the cattle owners. During the period indicated above we found 32,224 negative herds, or approximately 82% of the herds that were clean. In the clean herds there were 183,878 animals or approximately 61% of the 303,338 tests made that were negative. This is the situation we must cope with because the infected herds are scattered throughout the twenty-nine counties in the state and many of them are among the range or semi-range cattle which, as I have pointed out, are presenting real problems with respect to our ability to free them from disease and to maintain them free.

The test, conducted each year from 1936 to 1939, shows a general reduction in per cent of infected animals. We have endeavored to concentrate our efforts in some sections that are more favorable for area work. We have three counties in which we have done sufficient work and have reduced the percentage of infection to such a point that we believe we will be able, in the near future, to accredit them on a basis of one-half of one per cent reactors. These counties, however, are our most favorable areas for this type of work. We may not be able to do this in other sections of the state because at present there are a number of counties where this program does not seem practical or possible. Some of the reasons are those I have mentioned previously. Some of the cattlemen who were very good cooperators and still are sympathetic to the program have found it impractical and too expensive to carry on. This sentiment made it a little difficult for us to get an appropriation at the last session of the Legislature to carry on this work. However, when it became known that after May 1, 1939, the states would have to match Federal
funds for indemnity purposes, we secured the help of enough cattlemen to get a $40,000.00 appropriation plus a three mil levy on the assessed valuation of cattle. This was not obtained, however, without overcoming a great deal of opposition from some cattlemen, and particularly the range cattlemen. As a matter of fact the opposition was quite strong from the state and National Associations.

As a result of Legislative action we are now in a position to continue the cooperative program with the Federal Government, even though it is on a somewhat limited basis as compared to the work previous to May, 1939. Our future progress, however, will depend on our being able to carry on a practical program that the cattlemen in our State feel they can subscribe to.

As I have pointed out, we must be in a position to correct some misunderstandings that have arisen in the minds of cattlemen with respect to the testing program. We still have to explain the fact why animals that are designated as reactors to the test do not abort, and other animals that do abort fail to react to the test. Of course, we know these cases happen and there is an explanation for it, but, in many cases, it is still a mystery to the cattlemen. We also find it difficult to conduct retests on range and semi-range herds frequently enough to free them from disease.

Another problem that has some bearing on the program in our section is due to the fact that there is a tendency, on the part of cattle commission firms and marketing agencies, to discriminate against Bang's reactor cattle and consequently to quote lower prices for them when the B brand is found on the jaw. This has created quite a little dissension. As I have indicated, it is also difficult to control the procedure where new additions are made to the herds and even though these additions are made in conformity to sanitary requirements it is difficult under range conditions, and sometimes impossible, to keep tested animals apart from non-tested or infected animals.

There are still some cattlemen who think of the test only as a program of marketing their surplus cattle and receiving
indemnity for them. Perhaps one of the conditions that is responsible for as much opposition to the program as any other is the fact that we have had some experience with herds that have been tested regularly and the reactors removed until the herd has attained a negative or clean status. These herds, in many cases, have remained negative for some little time. They are, evidently, particularly susceptible herds because in our experience they have become reinfected and the results were more serious than was the condition of the herds at the time the testing program was started. You can readily appreciate that under our range conditions this constitutes a very definite handicap to the testing program.

There is also a practice among cattlemen that is growing, and that is the vaccination of mature animals. This practice is very difficult to control because in some of our areas the live stock men are being circularized by some biological houses and vaccine peddling companies. The vaccine is imported in spite of our State regulations, and is used, in many cases, by the live stock men themselves. In some cases temporary results seem apparent and live stock men subscribe to this practice rather than a testing program.

Live stock men, through their membership in state and national associations, and particularly the range cattlemen as a group, are opposed to the present test and slaughter method. They maintain the program is too impractical and expensive for them. This also adds to our difficulty in getting cooperation of cattlemen. It is our problem, as live stock sanitary officials, to control the disease and to use our best scientific knowledge in this respect. But, we still have got to consider the cattlemen and make the program practical and at the same time effective; keeping in mind the fact that a program that is too impractical and too expensive cannot succeed and will be difficult for the cattlemen to comply with.

We do have some things, on the other hand, that are enabling us to get cooperation on the program. I refer to municipal ordinances, that are being adopted by some cities, requiring that milk be produced from Bang's free cattle. In
our State we have a number of instances where undulant fever in humans has been diagnosed and the source of this infection is, in many cases, presumed to be in the milk supply. Public health officials are therefore, helping to impress the cattlemen with the necessity of a Bang's control program. We have regulations requiring that only cattle negative to the Bang's agglutination test be exhibited at live stock shows. This is also having a beneficial effect on the program. These points help to influence the sentiment in favor of the program, particularly as it affects the dairy men and the pure bred breeders, but we still have the range and semi-range cattle that constitute a big percentage of our cattle population. They must be handled on some practical program.

Opinions with respect to a Bang's Control Program are at variance. I should like to refer briefly to the proceedings of the last annual convention of this Association. Mr. J. E. Brock, representing the American Live Stock Association, read a paper and in substance stated that they were not in accord with the present test and slaughter method of controlling the disease. He stated, however, that they felt that the present calf-hood vaccination program should be given a great deal more attention, with the idea of developing it past the experimental stage. In this same report you will also find that Dr. C. U. Duckworth, State Veterinarian of California, spoke and advised that their cattlemen were not in favor of the present test and slaughter method. Dr. H. M. Gow, State Veterinarian of Colorado, also spoke and indicated that they were favorable toward some form of calf-hood vaccination in their State.

Dr. Hadleigh Marsh of Montana states, in the discussion on Bang's disease, as follows: quote—"We believe it is worth while to test some of our range cattle. I think, in the case of strictly range cattle, when there is no winter feed, that very likely Bang's disease need not be a very serious problem. But, in most of our western states the majority of cattle are fed in the winter time when the infection spreads"—unquote. He states further—Quote—"In combination with an annual
fall test we are trying out vaccination on quite a large scale. It looks as if the calf-hood vaccination should give us some results. We do not believe it does any harm, so we are trying it. But we do not believe in doing that to the exclusion of the blood testing of these herds, although with most of our range cattle the program that is carried out with dairy cattle, with frequent tests and cleaning up on that basis, is quite impractical”—unquote.

Opinions differ as to the value and practicability of a calf-hood vaccination program. In the same report is a paper delivered by Dr. Leo F. Rettger. Speaking of vaccination he has the following to say:—quote—“Vaccination has, it seems, still to establish its merits. Whatever its merits, if it has any, vaccination against Bang’s disease is incompatible with any system of blood testing and elimination of disease by removal of infected animals. Vaccination often causes animals to react to the agglutination test, and thus vitiates the value of the test. You might as well try to mix corn syrup and machine oil and call it maple syrup”—unquote.

In contrast to this I desire to quote from the remarks of Dr. W. E. Cotton, in which he states—quote—“I cannot agree with Professor Rettger with respect to it being incompatible with the test and slaughter method. I do not see why it could not be used to advantage in connection with such a method. If the vaccination is successful the animals should either cease to react or react in titers too low to mean infection within a year, and any ones giving real reaction after that time could be regarded as infected and treated accordingly”—unquote.

You will notice that these men’s views are not in accord on this subject. I have been endeavoring to show that experiences in various sections of the country are somewhat different with respect to the Bang’s Control Program and that some existing conditions may make it necessary for us to suggest a program a little different from the present test and slaughter program.

I should like to advise with respect to our experience on calf-hood vaccination. It is true that calf-hood vaccination
is considered to be still in the experimental stage and it should not be recommended for general use. However, I believe there are conditions wherein the individual herds or groups of herds, particularly in our range country, could be handled on a more practical basis with the assistance of a calf-hood vaccination program.

Referring to the report of the Bang’s committee of the American Veterinary Medical Association published in the November issue of the Journal, the following statement is made: quote — “Unlike the vaccination of mature cattle, vaccination of calves between the ages of four and eight months does not disqualify animals and herds from eligibility for Federal and state indemnity payments.

Some vaccinated calves develop possible reactions to the agglutination test which persists indefinitely. The Federal Government will test vaccinated calves after 18 months have elapsed following vaccination and any reactors found are eligible for indemnity payments, under the test and slaughter plan of control”—unquote.

The committee states further that it is their belief that calf-hood vaccination, if used for Bang’s disease control, should be restricted to badly infected herds or to so called problem herds and even though the calf-hood vaccination program is still in the experimental stage, results obtained under the program so far seem to indicate that it will probably be of some value in the control program.

I cannot feel but that we could accomplish some rather definite results in our range areas which would permit the vaccination of calves, under official supervision, in combination with a test and slaughter method. If it were possible to get accurate information from the various field experiments on calf-hood vaccination being carried on in the states, the results would probably be enlightening. In the experimental work the Federal government has conducted in our State we have not had an opportunity to check as closely as we would like to have done on the calves that were vaccinated. In some cases the cattle owners who cooperated could not keep
an accurate record of some of the vaccinated calves, due to the fact that they were out on the range and, in some cases, were stolen or lost or died from other causes. The records that are available, however, indicate that the program could be a very great aid in controlling the disease.

In 1934, — 7 herds were on the calf-hood vaccination program. 91 calves were vaccinated. Of these 91 — 74 were tested in 1934 with the following results: 66 negative; 6 reactors; 2 suspects.

In 1936, — 47 of the 74 were tested the second time. The results were 46 negative and 1 reactor.

In 1937, — 46 calves were tested for the third time. The results were 41 negative; 5 suspects.

In 1938, — 41 calves remained and were tested the fourth time. The results: 39 negative and 2 suspects. Thirty-three of these calves were bled in 1939 and all were negative to the test and have calved normally.

In 1935, — 8 new herds were put on the program, with 71 vaccinated calves.

In 1936, — 56 of these calves were tested with the result that 51 were negative; 5 suspects.

In 1937, — 54 were tested the second time with the result that 42 were negative and 4 reactors, 8 suspects.

In 1938, — 31 were tested the third time with 29 negative, 1 reactor, 1 suspect. Thirty of these calves were bled in 1939 and all were negative to the test.

In 1936, — 16 new herds were put on the program and 103 calves were vaccinated.

In 1937, — 87 of these calves were tested with the result: 75 negative; 3 reactors; 9 suspects.

In 1938, — 75 were tested the second time with 66 negative; 4 reactors; 5 suspects. Sixty-two of these were tested in 1939 with the result that 57 were negative, 2 reactors, 3 suspects. All of them calved normally.
In 1937, — 25 new herds were put on the program and 202 calves were vaccinated.

In 1938, — 158 of these were tested with 140 negative; 3 reactors; 15 suspects. One hundred and forty-nine of these were tested again in 1939 with the results that 130 were negative, 12 reacted and 7 were suspects. They all calved normally.

The total number of calves vaccinated from 1934 to 1937 was 467 head. Of these 467 vaccinated calves 305 were tested in 1938 with the following results: 274 were negative, 8 reactors and 23 suspects. The per cent of vaccinated calves reacting was 2.6. These calves were in herds in which the infection was 15% or better. In most cases we endeavored to keep controls in the herds also. The controls, in most instances, reacted and aborted. Very often they proved to be inferior animals and cattlemen disposed of them rather than keep them. Consequently we were unable to keep our records on them.

We have several range herds and some dairy herds that are apparently free from Bang's disease, as a result of calf-hood vaccination in combination with a test and slaughter program. One herd in particular is a pure bred range herd. Before the Bang's program was started on this herd in 1934, breeding troubles were frequent and many animals consequently aborted. Several of the mature animals developed swollen joints and spoiled udders. It was decided to test the mature animals in this herd and eliminate those that reacted. In addition to this procedure we vaccinated the calves in conformity with the present calf-hood vaccination program. It was a range herd and it was difficult to always have the animals available for testing when we needed them. But we felt that by vaccinating the calves between the ages of four and eight months and testing them after a period of 18 months had elapsed, that we could build a negative herd that would carry some degree of immunity. The calves that reacted to the test after the period of 18 months following vaccination were removed from the herd as reactors. The mature animals in the herd were tested periodically and those
that reacted were removed from the herd. Today the breeding herd is composed of cows that were tested as mature animals and remained in the herd as negative, together with calves that were vaccinated each year and continued to give a negative reaction to the test. This herd, as I stated, had, at one time, a high percentage of infection. Recent tests on this herd disclose only one suspicious reactor. The herd is having no breeding troubles. All are calving normally and there are no complications developing in the herd. The herd is on the show circuit and probably has as much or more opportunity to come in contact with infection than do other herds. It seems that the disease free status of this herd, together with the immunity developed, is of considerable value. The owner is well pleased with the results and has been able to stay in the cattle business, whereas, under a testing and slaughter program he would have been forced out of the business.

We have a number of herds that have been freed from Bang's disease with this same method. This program, in the opinion of some, may not be desirable from the standpoint of ultimately freeing the herd from infection and controlling the disease. Yet, our experience indicates that there is a possibility that it could do just that. Such a program would be practical and feasible under our range conditions. We believe that we could get the cooperation of the cattlemen on such a program because it would be possible to vaccinate the calves and it would also be possible to test the mature animals, particularly the infected herds, at least once a year so that we could gradually move the infected mature animals out and add to the breeding herds the calves that were vaccinated and remain negative to the test. These herds that have been handled in this manner have, in our experience, remained clean while herds that were tested under the test and slaughter program, and attained a negative status, have later developed a serious reinfection, due to their susceptibility. We believe that if we could develop a program in our western range areas whereby such herds as may be deemed advisable by the supervising officials, could be placed under a program of calf-hood vaccination in combination with a
test and slaughter program on mature animals, that we could get results. The vaccinated calves would be tested also, after a period of 18 months had elapsed and those that reacted would be moved out of the herd in the same manner as reactors in the mature herd and these reactors would be eligible for the Federal and state indemnity payment. If there is anything to the calf-hood vaccination program, and I believe there is, then it would be a distinct aid in our range areas in controlling the disease. It will overcome many of the objections raised by our cattlemen. It will permit the cattlemen to stay in the business while getting a mature herd free from disease and at the same time will provide him with a new herd composed of animals that have some immunity to infection.

PRESIDENT AXBY: We will certainly all have to admit that we have heard a wonderful narration of the problems arising from Bang's disease control in the western states.

PRESIDENT AXBY: In looking over this audience I notice that we have a distinguished guest here this afternoon, and being a fellow Hoosier, I don't want to overlook this opportunity to present him. I am going to ask Dr. Saylor and Dr. Fisher to escort Congressman Gillie to the platform.

I am happy to present Congressman Gillie. (Applause.)

Remarks by George W. Gillie, Congressman from Indiana

Editor's Note: Congressman Gillie presented a very entertaining and instructive narration on the topic, "Behind the Scenes in Washington."

He told briefly of the manner in which the work of Congress is carried on, and gave some intimate glimpses of Congressional personalities.

Dr. Gillie's account of his tours through historic Virginia, and up the Hudson River Valley were particularly interesting and educational.

He congratulated the organization on its change in meeting place and made the following observation: "I wonder if it would not be a good thing, or a good plan, since the improve-
ment of the distribution of semen and the wonderful strides that have been made in this work in the last year, to have this organization pass a resolution to put this under the strict control of the Bureau of Animal Industry. We now have promiscuous shipping of semen everywhere, under all sorts of conditions, and by unscrupulous people. As I see it, in a year or two or three, you may have quite a bit of trouble.” (Applause.)

PRESIDENT AXBY: Thank you, Dr. Gillie. The next item is, "Preparation of Brucella Antigen for Official Testing." This paper is by Adolph Eichhorn and Howard I. Thaller, Animal Disease Station, Beltsville, Maryland, and Dr. Eichhorn will be in charge. Dr. Eichhorn. (Applause.)

PREPARATION OF BRUCELLA ANTIGEN

By A. EICHHORN, D.V.S. and H. I. THALLER, D.V.M.
Animal Disease Station, U. S. Bureau of Animal Industry, Beltsville, Md.

The first serological tests for the diagnosis of what are now termed Brucella infections were employed by Wright and Semple (1) in 1897 in undulant fever in man. Zammit found that this test was highly accurate in detecting infections in goats by using either blood serum or milk (2, 3), and, as a matter of fact, it was by this test that undulant fever in man was traced to the ingestion of goats' milk.

Probably the first use of the agglutination test to detect infection in cattle was made by a Danish veterinarian, Grinsted, in 1909. Soon after, its use became universal in the detection of contagious abortion disease of cattle.

The serum plate or rapid agglutination test was developed by Huddleson and Carlson (4) in 1926. The complement-fixation method was adapted to the detection of Bang's disease, but, while considered a satisfactory test, it has not been commonly used due to its more technical requirements.

In the light of our present knowledge of the variations which may occur in the sensitivity of Brucella antigens by
growth on various media, dissociation, heat, preservatives, density, and the difference in antigenicity of various strains, it is easy to see why vast differences have occurred in the antigens produced by various laboratories. Many labora-

tories developed a procedure of antigen preparation and checked the results of serum reactions with cultural studies of infected animals with the result that a titer of 1:100 was adopted as the minimum titer denoting an infected animal. Although the 1:100 titer was accepted as an indication of infection, no standard method of antigen preparation was accepted. On comparative or check testing of various antigens, very divergent and confusing results were observed.

Much was done to clarify this situation by special committees of the Live Stock Sanitary Association and the American Veterinary Medical Association, but considerable variation was existent when the Federal-State cooperative program for the control of Bang's disease was inaugurated.
in 1934. The Bureau placed a representative in the field to visit the various laboratories and suggest changes tending toward uniformity, but a questionnaire sent to these laboratories in 1937 revealed, among others, the following conditions: Ten distinct types of culture medium, 60 different strains of *Brucella*—not all of which were *Br. Abortus*—and 9 different methods for determining the density were in use. As was to be expected, when these various antigens were check-tested against Bureau antigen, a wide discrepancy in sensitivity was observed in many of the products.

It has been apparent to the Bureau, as well as to all others concerned with Bang's disease testing, that the chief factor militating against the effectiveness of the program for the control of Bang's disease is the antigen used in the various states. But the Bureau had no authority in this connection other than to suggest changes tending toward uniformity.

The committee on Bang's disease of the United States Live Stock Sanitary Association, at an annual meeting held in December, 1937, adopted a resolution which is in part as follows:
"That this Association recommend to the United States Secretary of Agriculture that he adopt a ruling providing that all Bang's disease antigen used for cooperative and official Bang's disease testing shall be prepared and stand-

Series of Sterile Rooms used in Antigen Production.

ardized in accordance with the method and standard designed by the United States Bureau of Animal Industry."

The conference on Bang's disease, of the North-Central States, held in St. Paul, March, 1938, made the following recommendation:

"That for more uniformity of results in the application and interpretation of the agglutination test, we strongly recommend that the Bureau of Animal Industry of the United States Department of Agriculture prepare and furnish Brucella antigen and that the use of any other antigen for cooperative state and Federal work be prohibited."

The special committee on Bang's disease of the American Veterinary Medical Association, at the meeting held in July,
1938, subscribed to this recommendation. Because of these recommendations, as well as those of other individuals and groups, and realizing that the use of a uniform antigen was the only means by which uniform results could be obtained, the Bureau accepted the invitation to produce all antigen used in the Federal-State cooperative testing. Requests for information from the various states engaged in this work as to whether or not they were in favor of accepting the Bureau's tube and plate antigens and the technique desired in their use resulted in unanimous acceptance.

In deciding upon what should constitute standard plate and tube antigens, studies had been made for several years of the procedures used by those laboratories whose products had been shown to give consistent results in Bang's disease eradication, and a standard for both types was developed. A description of the methods of preparation will be given later.
Information furnished by the various states as to the amounts of antigen desired showed that 60,000,000 cc of tube antigen and 360,000 cc of plate antigen would be required annually. Obviously, such mass production necessitated extensive construction and provisions for washing, medium making, sterilization, seeding, incubation, harvesting, standardization, sterility testing, storage, and packing. Since much of the equipment was devised particularly for this work, it is believed that a description of our arrangements would be of interest.

The provisions for glassware washing are much the same as in other laboratories. One essential addition is a special rinsing device for large Roux flasks, consisting of series of water pipes in which small-bore copper nipples have been inserted vertically. A flask is inverted over each nipple. Sixty-six flasks may be rinsed simultaneously.

In the preparation of medium, two glass-lined, steam jacketed kettles of 10 and 30 gallons capacity, respectively, are employed. This equipment is indispensable in the mass production of medium.

To expedite the handling of large numbers of Roux medium flasks, six mobile, all-metal carriages were devised. Each unit consists of a chassis mounted on rubber-tired wheels and a super-carriage mounted on steel wheels. The super-carriage has four reinforced shelves, each of which is capable of holding 70 to 75 Roux flasks, or a total of approximately 300 flasks. A rectangular, steam sterilizer was constructed to receive the super-carriage. After the truck is loaded with flasks in the medium room, it is wheeled to the sterilizer, where the super-carriage is wheeled into the sterilizer on tracks continuous with those on the truck chassis. After sterilization, the super-carriage is wheeled back on the chassis and covered with several layers of sterile gauze while the medium is being cooled. This mobile equipment is used continuously during the various processes of seeding, sterilization, and harvesting. After the cultures are harvested, the flasks are replaced on the carriage and returned to the sterilizer before washing. Obviously, this
mobile arrangement of carrying the flasks saves considerable time and labor.

The inoculation of the cultures, harvesting of the organisms, and the final bottling of the antigen are done in separate sterile rooms. These rooms are made of an angle-steel framework into which glass is set in a manner so as to be air tight. The doors are gasketed so that when closed, the passage of air is eliminated. These rooms are ventilated by an exhaust fan in the ceiling which builds up a slight negative pressure. The resultant intake of air must pass through a spun-glass filter. Each room is fitted with a work bench, vacuum, gas, and electrical outlets and lights. These rooms have proved so efficient that plates left exposed for 30 minutes, while work was being performed in the room, yielded only one to three colonies.

The incubator is a plastered, rock-wool insulated room in which as many as six of the above described carts can be placed at one time. The device used in the heating of this room is of interest because of its simplicity and the remarkably even temperature which it maintains. This unit consists of a small fan surrounded by a 2,000 watt heating element. The fan runs constantly to keep the air of the room in circulation. The heating element is governed by a bi-metallic thermostat. The temperature of the room is regulated at 37.5° C., and does not vary more than 0.5 degree under ordinary conditions. A graphic record of the temperature is kept by an electrical recorder. Shelves have been placed in one end of the room on which tubes, plates, sterility tests, etc., may be incubated.

The Sharples super-centrifuge is an indispensable piece of apparatus in antigen production, but care must be exercised in its use since the inhalation of its fumes, while in operation, cause illness in persons allergic to Brucella. To prevent this condition, the centrifuge was placed in a special steel and glass case with an exhaust fan which forces the air from around the machine into a sewer vent pipe. The case was partitioned; one portion enclosing the centrifuge, and the
other the *Brucella* suspension. Thus, adjustments can be made on the antigen side without exposing the operator to the fumes from the centrifuge.

**Antigen Production**

In selecting strains for antigen production, typical *Brucella abortus* strains are isolated, and are carried on potato agar medium until they produce a satisfactory volume of growth. Strains are used only after they have been proved to produce normal agglutinability with no signs of spontaneous agglutination either at usual temperatures or after heating. Stained preparations of the culture are made and examined microscopically to insure that the cells are normal and uniform in size and shape. Such cultures are transferred on agar slants each week, and, after being incubated for 48 hours, are sealed and stored in the refrigerator. Several strains of known reliability as to sensitivity and to the consistency with which they produce typical colonies according to the technique of B.S. Henry (5), are kept ready for use at all times. Before a strain is used as seed, from which regular harvests of antigen are made, it is again plated and new colonies picked for this purpose. After a strain is used in production, this procedure is repeated each week.

To produce seed for antigen production, agar slants are inoculated with the culture obtained from the picked colony. After 48 hours’ incubation, the organisms are collected and a sufficient number of 1,000 cc Roux flasks are inoculated to provide suspension for a week’s seeding. After incubation for 48 hours, they are returned to the harvesting room where each bottle is observed for contaminants. Thirty-five cc of sterile physiological saline solution is added to each flask, and the bacterial growth is suspended by gentle agitation. The suspension from each flask is transferred by pipette to a sterile 250 cc Erlenmeyer flask. The volume of each suspension is then increased to 225 cc by the addition of sterile physiological saline. This constitutes the seeding suspension.
Five cc of this diluted suspension is removed for purity check, and the remainder is placed in the refrigerator until needed. Detailed reference to the production of seed is made as it is believed that pure, undissociated strains of Brucella are a prime requisite in antigen preparation.

Approximately 800 Roux flasks of medium are inoculated for each batch and each flask is numbered with each seed lot. After seeding, the flasks are placed on the mobile carriage in an inverted position. The carriage is moved to the incubator where the medium is incubated 72 hours. It is then returned to the harvesting room where each bottle is examined microscopically for contamination. The water of condensation from each flask is removed by vacuum and approximately 40 cc of phenolated saline solution is added. The resultant suspension is removed by vacuum and that from all the flasks inoculated from a single seed lot is pooled in a single container. These suspensions are next examined microscopically for purity by Gram's stain of smear preparations, and those found suitable for antigen production are pooled prior to centrifugalization.

The pooled suspensions are run through a clarifier bowl of a Sharples super-centrifuge. The suspending solution is removed from the organisms which are collected in the bowl in a consistency which resembles paste. This bacterial mass is carefully removed and portions placed in 500 cc bottles, where it is weighed. Sufficient phenolated saline is added to make a 25% suspension by weight and the bottles are then placed in a shaking machine. In this form the suspensions are refrigerated after they have again been subjected to a microscopic examination for purity, and fermentation tubes inoculated to test their sterility. When each suspension is found to be satisfactory from the standpoint of purity and sterility, it is then ready for final dilution into tube or plate antigen.

In the preparation of tube antigen, sufficient phenolated saline is added to the stock suspensions to make a 4.5% dilution by volume as determined by the Hopkins tube
method (6). The density is further checked by the photo-electric method. The latter apparatus, known commercially as the photronreflectometer (7), has proved extremely satisfactory for this purpose due to the ease and speed in which density determinations may be made. The 4.5% suspension represents the concentrated tube antigen as shipped to field laboratories where final dilution is made by adding 100 cc of phenolated saline to each cubic centimeter of the concentrated suspension.

In the preparation of plate antigen, sufficient phenolated saline is added to stock suspensions to make approximately an 11% suspension by volume as determined by the Hopkins tube method and further checked by a photo-electric apparatus. To each 1,000 cc of the dilution are then added a mixture of 2 cc of a 1% gentian violet and 4 cc of a 1% brilliant green. After the material is thoroughly mixed, it is allowed to stand for 24 hours at room temperature to allow any organisms which may not suspend readily to settle to the bottom. The material is then filtered through cotton or nainsook.

**Comparative Sensitivity Tests**

Twenty-five serum samples with titers including 2 negative, 2 higher than 1:400, and the remainder having intermediate titers, are set up for both the tube and plate antigens, using a plate and tube antigen of known reliability as controls. The tube tests are observed at the 24th, and 48th hours. The plate tests are watched constantly for a period of 15 minutes. The results obtained on the plate test at the end of 8 minutes, however, are used for comparison. The observations made later than this are merely to insure that the maximum titer was reached in the shorter period.

When an antigen has passed the sensitivity tests satisfactorily, it is then ready to be bottled.

**Bottling of the Antigen**

The tube antigen, in concentrated form (4.5% cells), is bottled in 20-cc vials. Each of these vials added to 1,000 cc
of phenolated saline results in a suspension of the proper density for use as tube test antigen. The plate antigen is filled in 50-cc vials. This bottling is done in a separate sterile room and all further precautions taken necessary to insure sterility.

Smith fermentation tubes are inoculated from 3 bottles picked at random from each lot. These tubes are incubated for 7 days as a final sterility check.

After the antigen is bottled, a final comparison of sensitivity is made.

The bottled antigen is given an identification number, sealed, and placed under refrigeration until the results of the sterility tests are ascertained.

In each step of the preparation of antigen, records are kept in order that any error in preparation may be traced to its source.

It will thus be observed that in undertaking the production of all antigen used in the Federal-State cooperative program for the control of Bang's disease, the Bureau has taken every essential precaution to insure products not only pure from a bacteriological standpoint but uniform in agglutinability.

It is, however, recognized that aside from the official testing in connection with the cooperative program, considerable testing is being carried out by state and private laboratories; also by practicing veterinarians. These agencies employ antigens principally prepared in state or commercial laboratories. The advantage of a uniform standard antigen for testing for brucellosis is apparent, and while the Bureau of Animal Industry is not in position to supply the antigen for all testing, it will furnish a detailed method of preparation and also undertake the standardization of antigens submitted from all institutions which are authorized to prepare test antigens.
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PRESIDENT AXBY: Dr. Eichhorn has made some wonderful contributions and rendered such valuable service along the line of disease control that we are always indeed happy to hear from him. Thank you very kindly for this exposition relative to antigen.

The next item on the program is the report of the Committee on Bang's disease. May I say to you that just shortly before leaving, I received a telegram notifying me that Dr. Fitch was sick, and that he could not act in the capacity of either Chairman or as a member of the committee. I appointed Dr. Cotton in lieu of Dr. Fitch, and then that necessitated a new chairman, and I appointed Dr. Larson as chairman of the committee, and he accepted that chairmanship.

Now we are ready to receive the report from Dr. Larson. Dr. Larson, State Veterinarian of Wisconsin.
REPORT OF THE
COMMITTEE ON BANG’S DISEASE

DR. C. P. FITCH, Chairman, St. Paul, Minnesota
DR. A. E. WIGHT, Washington, D. C.
DR. H. C. GIVENS, Richmond, Virginia
DR. C. D. STUBBS, Little Rock, Arkansas
DR. V. S. LARSON, Madison, Wisconsin
DR. R. M. SARD, Dover, Delaware

Your Committee on Bang’s Disease in 1931 as a part of their report included a table on the interpretation of reactions to the agglutination test for Bang’s disease. This table was as follows:

<table>
<thead>
<tr>
<th>Dilutions</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:50</td>
<td>Negative</td>
</tr>
<tr>
<td>1:100</td>
<td>Suspicious</td>
</tr>
<tr>
<td>1:200 or 1:250</td>
<td>Suspicious</td>
</tr>
<tr>
<td>X</td>
<td>Positive</td>
</tr>
<tr>
<td>X</td>
<td>Positive</td>
</tr>
</tbody>
</table>

This has stood the test of time. It is still in the light of our present knowledge the most reliable guide we have for the interpretation of the agglutination reactions for Bang’s disease.

For several years your Committee on Bang’s Disease recommended that the Federal Bureau of Animal Industry be requested to supply the antigen used for testing for Bang’s disease in a similar manner to their supplying tuberculin used in the tuberculin test. This year the Bureau has been able to start this work, and we are now assured in our official work of a uniform antigen prepared in a definite manner. It is highly important that all other antigens used from whatever source conform to the standards and sensitivity of the standard antigen prepared by the Bureau of Animal Industry. We desire to recommend that the Bureau of Animal Industry, take particular pains in their inspection service to note that all the antigens employed for testing for Bang’s disease be of the same uniform standard as that supplied from their own laboratories.

Your Committee again recommends that those producing or distributing Brucella vaccine and Brucella antigen under a government license shall be required to report to the live stock sanitary officials of the various states into which they send Brucella vaccine and Brucella antigen, indicating to whom the vaccine or antigen was shipped, the amount shipped, and the date of shipment. Unfortunately some producers and distributors are not following the recommendations of
your Committee made on several previous occasions. We believe that this situation is not conducive to the best understanding and works to the detriment of those ethical producers who effectively cooperate in this work. And we further recommend that the Secretary of Agriculture adopt ruling for control and elimination of Bang's disease similar to Regulation 7 adopted July, 1919, for the control and elimination of bovine tuberculosis, and if legislation is necessary for such ruling that Congress be memorialized to adopt such law.

Proposed Regulations Providing for Accredited Bang's Disease Free Areas

The extent of the area shall be determined by state and federal agencies cooperating. When testing is started the area shall be placed under quarantine and the following rules shall be enforced:

Sec. 1. All cattle, except steers and cattle for immediate slaughter, when moved into a quarantined area, shall be handled according to the following rules:

Sec. 2. Cattle from negative herds in accredited Bang's disease free areas or herds officially accredited Bang's disease free, according to recognized standards, may enter the area without being retested for Bang's disease. All such cattle shall be identified and shall be accompanied by approved certificates.

Sec. 3. All other male or female cattle, except steers and cattle intended for immediate slaughter, shall be required to pass a negative officially recognized agglutination test for Bang's disease within 30 days prior to the date of entry and shall be maintained in quarantine separate from other cattle and be retested in not less than 30 or more than 60 days after the date of entry. If found free, they shall then be released from quarantine.

Sec. 4. All cattle six months of age or over, except steers, in the area shall be tested for Bang's disease and all cattle reacting to the agglutination blood test for this disease in dilutions of 1:100 or more shall be slaughtered within 15 days of the date of the test and all premises where such reacting cattle were located shall be cleaned and disinfected within 15 days of the date of the removal of the reacting animals. The milk and milk products derived from reacting cattle shall not be used or sold unless properly pasteurized.

Sec. 5. If, as the result of a test of all the cattle required to be tested according to the provision of Section 4 above, the number of reactors does not exceed 1% nor the herd infection exceed 5%, the
area may be declared accredited Bang's disease free area for a period of three years by the state and federal cooperating agencies in charge of the work, provided that all infected herds shall be placed in quarantine and the cattle in them retested for Bang's disease at intervals of from 30 to 90 days until all of them pass two consecutive negative tests and pass a further negative test not less than six months from the date of the second negative test. And further provided that herds in which Bang's disease vaccine is being employed shall be maintained under strict quarantine and, for purposes of herd percentage, be classed as infected herds.

Sec. 6. At the expiration of the three-year period the area may be reaccredited for an additional three-year period if not less than 10% of all the herds, including 10% of the cattle six months of age or over, except steers, are retested and all herds located in the area that were found to contain reactors upon the last complete area test or county check test for Bang's disease, are retested, provided that the percentage of reactors among the cattle retested does not exceed one per cent of all the cattle tested in the area.

Sec. 7. In areas where the percentage of reactors to the test for Bang's disease was more than 1% of all cattle tested, the procedure for reaccreditation of counties should be in accordance with methods outlined in section 4 above.

DR. LARSON: This report is signed by a majority of the committee. Mr. Chairman, I move that this be referred to the Executive Committee.

The motion was regularly seconded.

PRESIDENT AXBY: You have heard the report. It has been moved that it be referred to the Executive Committee, which is in strict compliance with the Constitution that all reports be referred to the Executive Committee. Without putting the motion I hereby refer this report to the Executive Committee.

MEAT AND MILK HYGIENE

PRESIDENT AXBY: Now we start another session, Meat and Milk Hygiene. I am going to give Dr. Schalk an opportunity to give an explanation of some changes that have taken place in the program.

DR. SCHALK: Mr. President and Gentlemen: It becomes necessary for our Committee to announce some changes in this section of the program. A telegram just received informs us that Dr. A. E. Wharton, Supervisory Veterinarian of the Meat Inspection System
of San Antonio, Texas, is ill and unable to be with us to place their system before us.

Therefore, the first number of the section will be the "Importance of State-Wide Meat Inspection," by Dr. George E. Corwin, Commissioner of Domestic Animals, Hartford, Connecticut.

The second contribution will be made by Mr. I. W. Ringer, secretary-manager, Retail Meat Dealer's Association of Seattle, Washington. Mr. Ringer is doing a splendid job in Seattle and that section of the country. He has been instrumental in getting established more efficient and stringent Meat Inspection Regulations.

A brief report of the committee will close this section of the program. I am asking Dr. J. S. Koen, Storm Lake, Iowa, who has been a very active member of the Committee, to render the report.

PRESIDENT AXBY: The next item, then, is the "Importance of State-Wide Meat Inspection," by George E. Corwin, Commissioner of Domestic Animals, Hartford, Connecticut. Dr. Corwin. (Applause.)

DR. CORWIN: I wish to call your attention to our Connecticut State Plan for slaughter house inspection and the inspection of meat and meat products. We are very fortunate, after a number of years of trying to have our legislature enforce laws relative to state-wide meat inspection, and, at the time of the last Legislature, they saw fit to enact such a law, and they made appropriations whereby this law could be enforced.

STATE WIDE MEAT INSPECTION

By GEORGE E. CORWIN, Deputy Commissioner on Domestic Animals, Hartford, Connecticut.

It is with great pleasure that I undertake to present at this meeting a paper on state-wide meat inspection. I will deal with this subject as a general state proposition; that is, general meat inspection, or meat hygiene, where it is mostly neglected, in the lesser populated towns or villages. It is in the smaller communities where such matters are given very little attention. Most cities and larger towns, to some extent, have established effective meat inspection service, in order that some degree of protection may be maintained for locally slaughtered products. Inhabitants of the smaller villages are unprotected and take what is offered. Cities have the power to effect ordinances, and public health matters are
given much consideration; but country-wide or state-wide problems take on another aspect.

Generally speaking, people have a very vague idea of the importance to them of the proper system of meat inspection. An eminent authority once said, that on no question of social economy is the general public more ignorant than that of the wholesomeness, or otherwise, of the flesh they consume. Therefore, it is important that sanitary authorities guard them against abuse and injury.

Meat hygiene as a public health measure in the smaller or rural communities is still lacking. Attempts have been made by some state and local health authorities to formulate rules and regulations governing the local and state-wide conditions, and they have presented the same to legislative bodies for action, but when such matters are presented to legislators, it is surprising to note the source of opposition. Usually, those opposing such measures are the ones who are mostly interested from a monetary point of view, and those who wish to apply their trade without molestation. It surely would be better if the health of the multitude were given more consideration, rather than favoring a few who have no scruples for a neighbor's welfare. It would seem that our state legislators need more enlightenment on the subject referred to, rather than the people who are directly involved.

The local country milk supply was and still is, though not to the same extent, a source of danger. The city's population has been protected by ordinances which can be promulgated and enforced as concerns the source and condition of milk and food supplies. The same can be said about the meat supply, yet it is at the present time, in more danger than the milk, due to the fact that state-wide tuberculin testing is in vogue, which eliminates one of the dangers of milk-borne infections, and a form of state-wide dairy inspection, is enforced in nearly every state.

The United States Department of Agriculture, through the Bureau of Animal Industry, for a number of years, has maintained an effective system of meat inspection, in order
that carcasses, or meat for *interstate* shipment might be free from disease, and handled in a hygienic manner and made suitable for human consumption. If the Federal government deems it necessary and wise to protect its people in any state in this manner, why should it not be wise and proper for state authorities to protect its people with its *intra-state* products?

Public health matters are a national and state economic necessity, and the economic world realizes that the preservation of human life is a vital problem.

Meat, like milk, is one of the most important foods of mankind, and it is one of those foods which is obtained from animal sources which are, of course, more or less subject to important infectious diseases, as concerns the animal itself, or the consumer of its flesh and products. There are a number of diseases of animals, of an infectious nature, which are also communicable to man. These diseases are deemed of the greatest importance in meat hygiene, due to the fact that they are always more or less of a serious nature.

Even if the inspection of the carcasses had no great health significance, other than that of common decency, the inspection of such products should be considered from that standpoint, at least. Health agencies are a necessity and not a fancy of a certain group of misled individuals. There is probably no human food products handled, which is more exposed to contamination and filth than meat. Therefore, great importance should be attached to this economic health problem, and products from any animal source should be properly inspected, both ante mortem and post mortem, before being allowed on the market for human consumption.

An important feature is the handling of the product after slaughter. This we might term meat hygiene, and without this form of hygiene, as well as the careful inspection of carcasses, all carcasses should be condemned. The inspection of meat, the meat hygiene, gives a source of personal security where practiced, and certainly every one should be entitled to this form of security. Without doubt, many animals are
slaughtered and their meat presented for human consump-
tion, especially in local or country places, where the animal,
even before it was killed and dressed, should have been
absolutely condemned. Lightning-struck animals and cold-
slaughtered animals have been dressed and the meat offered
for human consumption.

It has been a common practice, and no doubt still is, that
when animals become unfit for any other purpose, and there
seems to be a danger of their losing their monetary value, to
slaughter them for meat purposes. This not only applies to
beef, but to pork and poultry as well. If it were possible to
maintain country-wide meat inspection, these conditions
would not prevail, but until such time as it is possible to
maintain a state-wide meat inspection, these practices will
continue. Until people at large have learned that all meat
or meat products, which do not bear an official stamp of
approval as being fit for human consumption, especially
applicable to raw products, should not be used; vile practices
will continue and health will be menaced. It still is necessary
to teach the public to respect the official stamp of approval,
or as has been said, they should be advised to look for the
imprint of the little purple stamp.

What Is Meat Inspection?

The object of meat inspection is the prevention and
elimination of dangers which threaten human life by the
consumption of noxious meat products and at the same time
offers or undertakes the task of protecting the meat con-
sumers in an economic relation from frauds and deceptions;
this inspection and protection to be placed in the hands of
responsible trained individuals.

The inauguration of regulations and principles governing
such matters can only be maintained and rightfully carried
out by statutory regulations, properly enforced. Meat in-
spection can not be properly performed except by those
persons who are properly trained in animal diseases and
pathology. I do not believe any make-shift program is
advisable, nor that meat should be inspected by any one not qualified in the manner described. Make-shift inspection, or the idea of giving people a false security, as regards food products, should not be considered. We are still aware, however, that local or country-wide meat inspection is still a very great problem. It is always in such matters as these, that it is necessary to consider, to some extent, the cost and the means, but the cost should not be considered too seriously when comparing any protection, given to human health. The conveining or inconveniencing of a few persons should not be given any consideration whatsoever. In connection with state-wide or country-wide meat inspection, it is also absolutely necessary that the hygienic standpoint be given due consideration, and how, both the problem of a state-wide and country-wide meat inspection can be enforced and maintained.

A Plan, As Adopted By Connecticut

In order to conduct an efficient meat inspection service and to respect and enforce meat hygiene, it is absolutely essential that we establish an abattoir, properly equipped and constructed. Such an establishment may be privately or municipally owned and so located that it may best serve its purpose. An abattoir may be located to serve a municipality, a town, or a county. However, it should be centralized for convenience. The maintenance of such a plant and the cost of inspection can be met, or partially met, by charging a nominal fee for slaughter and inspection.

For your consideration, I wish to offer the Sanitary code, as adopted by the State of Connecticut. This sanitary code is enforced in the State of Connecticut, and since its adoption and enforcement, the greatest improvement is noticed in the sanitary handling of raw meat products:

1. Every slaughterhouse or place where the business of slaughtering beef, poultry, or swine or preparing the same for market, is carried on, and the implements, utensils and appliances used therein, shall at all times be kept in a clean and sanitary condition.
2. No hogs shall be kept in connection with or within 500 feet of such slaughterhouse.

3. All offal, refuse and waste material shall be disposed of in a sanitary manner within twenty-four hours after slaughtering.

4. An adequate water supply, both hot and cold, must be provided and arranged so as to permit a thorough washing of walls, floors, and equipment of the slaughterhouse.

5. All bones and fat must be placed in covered containers and removed from the slaughtering room within twenty-four hours.

6. Hides or pelts shall not be stored on the floor of any room used for slaughtering, storing or preparing meats or meat food products.

7. The floors shall be of brick, concrete or other hard impervious material and properly sloped to outlets covered with removable grating, the bars of which, shall not be more than one-half inch apart.

8. The walls must be covered or made to a height of seven feet with concrete at least three inches thick or other approved impervious material.

9. All rooms must be properly ventilated and well lighted.

10. Properly ventilated and refrigerated cooling and storage rooms must be provided. These must be kept in a clean and sanitary condition. They must be screened so as to prevent the entrance of flies and insects.

11. All apparatus, containers and implements used must be thoroughly cleansed daily after using, with boiling water, live steam or other efficient sterilizing agent subject to the approval of the health officer.

12. Meat must be placed on racks, hooks, tables, or in suitable containers, and shall never be placed on the floor.

13. All offal or flesh fed to swine must be sterilized by cooking before feeding.
14. The yards, fences, pens, chutes and alleys on the premises, whether they are used or not, shall be maintained in a sanitary condition.

15. Proper facilities shall be provided for the collection and disposal of all liquid wastes, including blood, floor washings, and other materials.

16. Toilets must be provided for the use of the employees, the type and location to be approved by the health officer.

Following the adoption of the Sanitary Code, setting forth the necessary conditions to maintain a properly equipped abattoir and a hygienic handling of animals for slaughter and their carcasses for meat consumption, I offer for your consideration the Statutes Concerning the Licensing of Slaughterhouses and the Inspection of Meat and Meat Products as adopted in Connecticut, and the Rules and Regulations promulgated by the Department of the Commissioner on Domestic Animals, which Department enforces such Statutory Laws, and Rules and Regulations. The Laws, Rules and Regulations adopted, you will note are not very lengthy or complicated. We find that we can enforce these Laws, Rules and Regulations to our satisfaction and for the protection of the public at large. It is very hard to lay down a set rule or a statutory regulation governing the inspection of meats, but I believe that such a regulation should meet certain requirements, so that the inspection of meats may be properly and scientifically met.

Again, for your consideration, I offer the meat inspection act, and the rules and regulations governing the enforcement of the act:

The Licensing of Slaughterhouses and Inspection of Meat and Meat Products

Section 751e: (a) No slaughterhouse or place where the business of slaughtering animals is carried on shall be operated or maintained in this State without obtaining a license from the commissioner on domestic animals. The
commissioner on domestic animals shall not issue a license for the same except with the written approval of the health officer or board of health of the town, city or borough within which the slaughterhouse is, or is to be, located or the business carried on. Each such license shall expire on the thirtieth day of June next following the date of issue and may be revoked for cause, after a hearing, by the commissioner on domestic animals. Such license shall be exhibited in a conspicuous place on the premises licensed thereby.

(b) Said commissioner shall make regulations governing the slaughter and inspection of animals, including the construction of buildings and pens for the same, sanitation and inspection of buildings, pens, meat and meat products, and such other regulations as in his judgment may be necessary for the protection of the public health and the humane treatment of animals, and may alter or repeal the same. Such regulations shall be published by said commissioner and a copy thereof shall be sent to the owner of each slaughterhouse licensed under the provisions of this section.

(c) There shall be one or more inspectors of slaughterhouses for each town, city or borough within which a slaughterhouse is located, but one inspector may act as inspector for more than one town, city or borough. Said commissioner shall establish qualifications necessary for such inspectors. Such inspectors shall be appointed by the mayor of any city, by the town council, or, if there be no town council, the selectmen, of any town or by the warden of any borough; but such appointment shall not be in effect until it shall have been approved by the commissioner on domestic animals. Each such appointment shall be for a term of two years. Should the office of meat inspector in any town, city or borough remain vacant for a period of ten days, said commissioner shall appoint an inspector for such town, city or borough. During any vacancy in said office or during the illness or inability to act of any meat inspector, the town, city or borough affected may appoint any veterinarian registered in the state to act as temporary meat inspector. Said commissioner shall issue to each inspector a badge and
stamps for stamping meat and meat products. Any inspector appointed under the provisions of this subsection may be removed for cause by the appointing authority, with the approval of the Commissioner on domestic animals.

(d) Each meat inspector appointed under the provisions of this section shall enforce the regulations established under this section, shall investigate any violations of the same and, when necessary, shall cause prosecution to be made therefor. In the performance of his duty, any such inspector may enter upon all premises where he has reason to suspect slaughtering or the preparation of meat or meat products, or the holding for sale of the same is being carried on. The meat inspector shall be present at the time of slaughter and stamp, with the official stamp, all carcasses inspected and passed according to the regulations established under this section. He shall condemn and cause to be destroyed or otherwise dispose of any carcass or part thereof unfit for food, at the expense of and without compensation to, the owner.

(e) No person shall slaughter any animal for the purpose of food other than within a licensed slaughterhouse and in the presence of a meat inspector appointed under this section or of a federal meat inspector, except an animal slaughtered for the owner's domestic use and except rabbits, hogs, sheep and calves, not to exceed fifteen in any one year, for the purpose of sale. Such exception shall only apply when such rabbits, hogs, sheep or calves shall be slaughtered by the farmer, his employee or a member of his family, on the farm on which they were raised. Poultry not slaughtered on the owner's premises but sold to be slaughtered, shall be slaughtered in a licensed slaughterhouse, but need not be slaughtered in the presence of a meat inspector, and the carcasses need not be inspected by the meat inspector.

(f) No person shall, for the purpose of human consumption, sell, offer for sale, keep with intent to sell, transport or give away, any carcass or part thereof which is diseased or unfit for human consumption, or any meat from any carcass that has not been inspected and passed and so stamped by a
meat inspector, except meat slaughtered under federal regulations and inspected and stamped by an inspector of the United States bureau of animal industry, or poultry, hogs, sheep or calves slaughtered under the provisions of subsection (e) of this section, or cattle slaughtered in the presence of a veterinarian assigned by the commissioner on domestic animals in accordance with section 853c.

(g) Each town, city or borough within which a slaughterhouse is located shall, except as hereinafter provided, establish fees for the inspection of meat and meat products, which fees shall be collected by the inspector at the times of inspection and shall be paid to the treasurer of the town, city or borough. Such inspector shall be paid for his services by the town, city or borough for which he acts. If one inspector shall act for more than one town, city or borough, the compensation for his services shall be paid by the towns, cities or boroughs for which he acts and shall be pro-rated on the basis of the number of animals inspected by him in each such town, city or borough.

(h) Any town, city or borough or any local health officer may impose regulations in addition to those established by said commissioner and this section, which regulations shall apply to all slaughtering of meat offered for sale, or kept for that purpose or transported, within their jurisdiction. No fees shall be required in addition to those imposed at the time of slaughter, except for storage.

(i) The commissioner on domestic animals may appoint such assistants as may be necessary to carry out the provisions of this section.

(j) Any person, firm or corporation who shall violate or cause to be violated any of the provisions of this section or any regulation established hereunder shall be fined not more than two hundred and fifty dollars or imprisoned not more than one year or both. Subsection (h) effective June 19, 1939.

Sec. 1450e. (1) Carcasses of young calves, pigs, kids and lambs are unfit for human consumption and shall be con-
demned if (a) the meat has the appearance of being water-soaked, is loose, flabby, tears easily and can be perforated with the fingers; or (b) its color is grayish red; or (c) good muscular development as a whole is lacking, which condition is especially noticeable on the upper shank of the leg, where small amounts of serious infiltrates or small edematous patches are sometimes present between the muscles; or (d) the tissue which later develops as the fat capsule of the kidneys is edematous, dirty yellow or grayish red, tough and intermixed with islands of fat.

(2) The possession of any such flesh dressed in a manner suitable for sale or use shall be deemed prima facie evidence of an intent to sell and a violation of the provisions of this section. All unborn and still-born animals shall be condemned, and no hide or skin thereof shall be removed from the carcass within a room in which edible products are handled. Any person, firm or corporation which shall violate or cause to be violated any of the provisions of this section shall be fined not more than one hundred dollars or imprisoned not more than six months. Effective April 5, 1939.

Rules and Regulations

1. Any person maintaining any establishment where the business of slaughtering animals is carried on shall make application to the Commissioner on Domestic Animals on forms furnished for that purpose, for the licensing of such an establishment. The application must be accompanied by a certificate of approval of the local health officer or board of health.

2. The construction, maintenance and sanitation of such establishments shall be in accordance with regulations 240 to and including 248 of the Sanitary Code as promulgated under Section 2370 of the General Statutes by the State Department of Health.

2a. The location and plans for altering or remodeling old slaughterhouses or building new slaughterhouses shall meet
with the approval of the proper local authorities and the Commissioner on Domestic Animals.

3. Every establishment shall be provided with an unloading platform, the construction of which must meet with the approval of the State Inspector.

4. The removal of any animal brought to the establishment is prohibited.

5. a. All live poultry establishments maintained for the purpose of housing and selling poultry, and where slaughter of same is to be carried on, shall provide a slaughter room which must be constructed and maintained in accordance with Regulation 2.

   b. Poultry slaughtered in a licensed poultry establishment need not be killed in the presence of an inspector and will not require the inspector's stamp.

   c. Any poultry establishment will be subject to the inspection of the State Inspector at any and all times.

6. All inspectors of slaughterhouses to be appointed by the appointing officials of the town, city or borough, and to be approved by the Commissioner, shall possess the following qualifications:

   Each inspector appointed shall either be a qualified licensed veterinarian or have a general knowledge of the diseases of meat-producing animals, and shall be versed in the conditions that affect the wholesomeness of animal food products, and shall have had at least five years' experience in the handling and slaughtering of meat-producing animals and have a general knowledge of slaughterhouse sanitation and hygiene.

7a. It shall be the duty of the inspector to enforce the rules and regulations as set forth in this act and to condemn and destroy any carcass or parts thereof which he shall deem unfit for food, and which may be affected by any contagious or infectious disease, or emaciated, or any animal that has not been killed in his presence.
b. The inspector shall require that all animals placed in a position to be slaughtered, shall be handled in a humane manner, and that no cows or calves or other meat-producing animals shall be hung or swung by the leg unless immediately slaughtered.

c. The inspector shall keep a complete report on forms furnished by this Department, of all animals slaughtered.

8. The Supervising State Inspector of Slaughterhouses and Meat Inspection shall be a veterinarian, a graduate of a recognized veterinary college, licensed by the State Board of Veterinary Registration and Examination to practice veterinary medicine in Connecticut. He shall have supervision over all slaughter establishments and over all meat inspectors, and shall render such service and supervision under and by the direction of the Commissioner on Domestic Animals.

9. The Slaughterhouse Inspector shall have had at least five years of full time paid employment as a butcher or slaughterhouse assistant and must have a general knowledge of sanitation and hygiene as applied to slaughterhouses, a general knowledge of the anatomical structure and locations of various organs and glands of meat-producing animals, and knowledge of the construction and equipment needed in large and small slaughterhouses.

In bringing to your attention some of the fundamental features pertaining to a system of meat inspection and hygiene which should be applied to local conditions, I do so with a desire to stimulate interest in the introduction of sanitary science in the rural communities. The introduction of such a measure would tend toward the economic and social welfare of any state. In this matter, the health and food supply of our people is involved, and public sentiment through proper educational matters and centers, is an essential too often neglected.

FIRST VICE-PRESIDENT PORT ASSUMED THE CHAIR.

CHAIRMAN PORT: Thank you Dr. Corwin for this very able paper. The subject of meat inspection is always of interest to the members of the Association.
The next paper will be on: "Meat Inspection in the Northwest," by I. W. Ringer, secretary-manager, Retail Meat Dealer's Association, Seattle, Washington. Mr. Ringer. (Applause.)

MR. RINGER: Gentlemen, when I was asked to prepare this paper, some months ago, by Dr. Koen, through Dr. Schalk, I was advised in the letter that they had to invite people who had to be in Chicago at that time because they did not have any money to pay any expenses. Now, I do not see why anybody would have to have their expenses paid to come to a meeting of this kind. I think it is one of the most important meetings held during the year that pertains to the Live Stock and Agricultural Industry.

On first thought I said: "Well, I am in Chicago principally in the interest of the National Live Stock and Meat Board Work during that particular week." I do not know how many of you have come in contact with R. C. Pollock, general manager of the Live Stock and Meat Board, and I do not know how many of you know what his functions are, but his function is to be in the front line trenches, and make it easier for the retailers to sell meat. Now your job is to keep these animals healthy so we can sell them, and Pollock's job is to get it before the consumers so that they will want to eat meat. So the retailers fit into this picture very decidedly.

We have a great many obstacles to overcome. I am not going into much detail here, but I have three folders of headlines of different magazines about the diseases in meat. Here is an outstanding one: "Worms in half-cooked pork baffling medical men. Cook it well." Who wants to eat worms, even if they are well cooked?

We have article after article about diseased meat. So I think we have a place in this picture, and I have prepared a paper under the heading of "Meat Inspection in the Northwest." I doubt if anyone has put in more hours than I have, trying to get adequate inspection in the Northwest. Since I came to this convention I received a wire saying that a program I had been working on for fourteen years was finally passed by the council, eight to one. This installed a federal inspector in charge of our meat inspection in the City of Seattle.
MEAT INSPECTION IN THE NORTHWEST

By I. W. RINGER, Secretary-Manager
Seattle Retail Meat Dealers Association.

My start in the meat industry was at the age of seven herding cattle in South Dakota. At twenty-five I was managing a retail meat market in Seattle. In 1910 there were no city or state laws requiring meat inspection. I can only recall two Federal inspected packing plants in the State of Washington.

During the World War I started in a modest way raising hogs. The venture developed rapidly. Within a relatively short time I was feeding 14,000 animals on a ranch near Seattle. The principal source of food was refuse from the city markets, boats, hotels and city garbage supplemented by Nebraska corn.

When the flu epidemic spread over the country near the end of the War, the hogs in our part of the country died like flies. The death rate among my animals was tremendous. I prepared a hospital and had two veterinarians in constant employ, working day and night to discover the source of the disease and attempting to eradicate it. We burned the body of each hog that died. I found, however, that there were many alien producers, mostly Japanese, operating in the fertile valleys surrounding Seattle who butchered and marketed their sick hogs in the Seattle market. I brought this to the attention of some of the Seattle citizens and, of course, there was no difficulty in inducing the Seattle Health Commissioner and City Council to stop this practice. An ordinance was passed contracting the disposal of garbage, which assured the Health Department that this source of food could only be disposed of to producers of hogs who had sound animals. This helped materially to take off the Seattle market the principal part of the diseased hog carcasses.

I realized at that time that the consuming public was receiving no protection from unwholesome and diseased
meat, except that which came from Federal inspected plants. My ideas about inspection laws were rapidly maturing and crystallizing. I was determined to devote my best efforts to cleaning up this situation and I have worked constantly from that time to the present time in trying to improve conditions in the meat industry in the Pacific Northwest.

**Enactment of Ordinance**

By 1926 I had secured the enactment of the first Seattle meat inspection ordinance. This ordinance forbade the sale in Seattle of hogs, sheep or beef unless the slaughterer brought in for inspection the vital parts of the animal attached to the carcass. A charge was made by the city inspector of ten cents per hog and sheep carcasses and twenty-five cents per carcass for beef for this inspection service. The city inspector was a licensed veterinarian. When the inspector completed his work he stamped the carcass with the Seattle inspection stamp. This ordinance was a tremendous improvement over the situation that existed before that time.

By 1931 conditions had changed in Seattle and I felt that the public were ready for a more comprehensive law. Prior to that time about 65% of the meat sold in the city came from Federal inspected houses, but by 1931 a number of small slaughterers, not under Federal inspection, had begun to distribute their products widely in Seattle. The business of the Federal inspected houses seemed to be somewhat on the decline. There existed no provision for sanitary inspection of plants nor was there any provision for ante-mortem inspection. Large numbers of farm-killed animals were coming to the consumers through string butchers without any inspection.

For these obvious reasons and to protect the legitimate dealers it seemed highly important that the inspection laws be made more drastic. The ordinance of 1931 provided for inspection of plants in the city and within one mile of its limits. The ordinance required plants outside of the city to
agree to allow Seattle inspectors to examine them for sanitation as a condition to permitting the sale of their products in the city. It also provided for ante-mortem as well as post-mortem inspection. It provided for stamping the carcasses that had passed inspection with a state inspection seal. This ordinance did not exempt the farm-killed animals. There was provision also for the sanitary inspection of retail markets. Each retail market was required to maintain a walk-in cooler. Each meat cutter was required to take a health examination and secure a certificate of competency. The program was financed by a graduated schedule of license fees on all members of the industry. The fees ranged from $10 per meat cutter to $400 for local packing plants. Retailers paid $25, wholesalers $200, Federal inspected houses selling in the city $250, sausage manufacturers $250, city packers $400, and slaughterers outside of the city sending their products into the city $200. This schedule of fees produced an annual income of approximately $32,000. With this sum the city employed five veterinarians to inspect slaughtering and two lay inspectors to inspect sanitation of the retail markets. The fund was more than ample and built up a substantial reserve.

By 1934 there was sufficient sentiment developed in the city to secure the enactment of the first compulsory grading law. The city adopted the Federal grades for beef and lamb and secured a Government grader by contract with the Department of Agriculture. Under this grading ordinance no beef or lamb could be offered for sale in the markets of Seattle unless it bore the city grade stamp. Retailers were not permitted to falsely advertise their beef and lamb. I feel this ordinance has eliminated much false advertising. It assures the consumer of getting value for every dollar's purchase. There are about thirty-five licensed slaughterers who sell meat in Seattle. Each of them must submit to the grading of their products. The chance of an unlicensed slaughterer selling in the city is made remote by the grading ordinance for the lay inspector may easily find the ungraded meat in the retailer's market. The penalties for violation
are severe. The grading ordinance has proved to be a health measure in that it keeps this unlicensed meat off the markets. Violations are not numerous. The ordinance is easily enforced. The grading ordinance has been in effect for more than five years. At the present time the city is collecting a per capita charge to finance the grading service but until this year we were able to finance the grading out of the license fees I have already referred to.

In 1935 more money than was necessary to carry on all inspection and grading was in the meat inspection fund. The retailers and sausage factories, however, induced the Council to reduce their license fees. Then our trouble really started. This resulted in a gradual depletion of the meat inspection fund. About two years ago the fund went into the red. It became necessary to make a revision of the fee schedule. All of the various interests selfishly fought for reduction of their particular fees and the increase of the other fellow's. The hearings brought a bitter attack on the whole city inspection system, principally from a number of small slaughterers located outside of the city who charged, with much merit, that the large local city plants were receiving an inspection service worth several thousand dollars per year for their $400 license fee and that the country slaughterer was paying the state a per diem fee for getting his meats inspected and also was compelled to pay tribute to the city for the privilege of selling his meats and that this tribute went to defray the inspection of the city plants. I will have more to say on this later.

I have realized for many years that the problem of sale of wholesome meat is not limited to one city or town. It is a national problem. In the State of Washington our legislature meets every two years but can only remain in session for sixty days. As far back as 1919 I attempted to secure the passage of a state-wide meat inspection bill. At practically every session of the legislature since that time I have sought some sound meat inspection law. The attitude of individual legislators toward the problem is almost unbelievable. In the session of 1919 I was instrumental in
securing a law which protected live stock against adulterated foods. This was a hard fight but at the same time I was urging and have since urged the passage of a meat inspection bill to protect humans, but I was unable and I am still unable to induce the legislators to enact such a bill. Stated in another way: Twenty years ago our lawmakers protected dumb animals from adulterated foods. Our lawmakers have not yet protected articulate humans from diseased and un-wholesome meats.

Our State Department of Agriculture, however, has courageously made much progress. Under an act of the legislature which empowered the Board of Health to make rules and regulations with respect to health, the Secretary of Agriculture provided a method by which meat packers in the State could secure an inspection of their products. The inspection was not compulsory but merely voluntary. It is to the credit of fifty of the one hundred forty-three slaughterers of meat in the State that they voluntarily accepted this inspection service. The State has one supervisor and ten full-time inspectors. The State also appoints resident veterinarians who do part-time ante and post-mortem inspections for the small slaughterers in their particular vicinities.

All this service is paid for on a time basis. A full-time inspector stationed at one of the large State plants will receive $200 per month.

The State is collecting and spending approximately $60,000 per year in this service. There are one hundred forty-three slaughtering establishments in the State. They are called “bonded killers.” The bonding is to protect against stolen cattle. The bond is not to protect against a dirty or filthy establishment or diseased product. This bonding law has nothing whatever to do with the unwholesomeness of either the cattle or the sanitary condition of the butcher.

Dr. Hales of the State Department of Agriculture in Washington has materially improved conditions in my State. The weakness of our State inspection is that the Depart-
ment’s only coercive pressure is to withdraw the inspection service for misconduct of the slaughterer. There is no other punishment. The slaughterer pays for the service of the inspector. It takes a courageous inspector to recommend the withdrawal of inspection service and thus lose his job.

There have been a few smaller cities in the State of Washington that have enacted meat inspection ordinances. Some of these have been modeled after Seattle, but in most instances the smaller cities have merely taken the fee schedule enacted in Seattle and have used it as a protective tariff by which the local packing house is favored over the outside producers of meat who try to sell in the city. Here is a typical example: Seattle has a population of approximately 375,000. Wenatchee about 30,000, each city imposes a $200 license fee on every outside packer who wishes to sell his products in the city. The fees are identical, though the Wenatchee market is less than one-tenth the size of the Seattle market. It can readily be seen that this form of ordinance operates as a protective tariff in favor of the Wenatchee packer and against Seattle houses and state packers. The collection of the fees from outsiders gives the local packer a $2400 per year inspection service for the payment of approximately $200 to $400 license fee. Several towns and cities in Washington have passed ordinances similar to Wenatchee. The result is that a large State house doing business all over the State and the Federal inspected houses who attempt to do business in all cities must pay the license fee in each city. For instance, a Federal inspected house that receives no actual inspection may, in the aggregate, pay well over $1000 in license fees. In other words, the well-inspected Federal house contributes to an inadequate municipal inspection of its competitor.

Our efforts to secure an adequate State inspection law at the 1939 session of the legislature brought direct charges against we Seattlites by the country slaughterers. With much justice, they said that Seattle had been guilty of this same discrimination in fees of four Seattle plants. These four get complete full-time inspection for $400 per year.
The State inspection service on a per diem basis would have cost each of these plants well in excess of $2400 per year. The country slaughterers supported by the Department of Agriculture secured the passage by the House of Representatives of a meat inspection bill which was to be financed by a stamp tax on each carcass, or part of a carcass, of beef, lamb and hogs offered for sale. As passed, the stamp tax ranged from ten cents per carcass on hogs and sheep to twenty-five cents per carcass on beef. The country slaughterers and dairymen in the State strongly urged its passage. The Seattle packing houses in their interests fought it. The Federal inspected houses were naturally bitter in their opposition because they would have had to pay, at least, 65% of the stamp tax and the revenue would have gone to defray the expense of inspecting their competitors.

I am no champion for the large Federal inspected packers. Any one who knows my record, representing the retail meat dealers, will agree with that statement, but I am, at least, fair enough to admit that there is no justice and I doubt if there is a constitutional right to take the money of an adequately inspected Federal house and spend it to defray the cost of inspecting the business of the Federal packer's competitor. The proposed Washington law would have required every Federal house in the State of Washington, to pay from five to twenty-five thousand dollars in stamp tax, although no state inspector would ever render any service or ever go upon the premises of the Federal inspected houses.

At this 1939 legislative session I sponsored a comprehensive inspection bill modeled after the Federal and financed by $60,000 general appropriation and license fees which reasonably apportioned the balance of the estimated expense to administer the Act. These license fees did not even equal what the packers are now paying in the aggregate to the various municipalities in license fees. Even the Federal houses seemed to recognize that an adequate state inspection law would be a direct benefit to them. They made no serious objection to paying a substantial license
fee toward aiding the State in this inspection. An adequate meat inspection in the State would have cost about $150,000 per year. The bill I sponsored would have raised $90,000 with the license fees and $60,000 was to come by general appropriation. In other words, the cost to the citizens of the State would have been about six cents per annum per resident. One airmail postage stamp per year and the consumer would have been assured that he could eat wholesome meat. If the small country slaughterer had not attempted to penalize Federal inspected plants with probably 80% of the tax burden of State inspection, I am thoroughly convinced that we would now have an adequate state inspection law in the State of Washington.

Until this year the City of Seattle, Department of Health has had one man in charge of the inspection of milk, meat, markets, dogs, cats, horses and the same officer has attempted to supervise a rabies quarantine. This is the situation in many cities. Seattle is not unique in this respect. The man charged with the responsibility of seeing that wholesome meat is sold in Seattle was spending most of his time conducting post-mortem examinations of mad dogs instead of hot dogs. Recently we have secured a division of the duties and have created the office of chief meat inspector in Seattle. I have made a most determined fight and experienced bitter resistance in my efforts to secure an individual of adequate ability to fill this new position. Dr. Mohler and others have given me many valuable suggestions and recommended a number of well-qualified people for this position. It seems self-evident to me and it must to this audience that the person to hold this position should have mature experience as a Federal meat inspector under the Bureau of Animal Industry. I do not need to point out to you the high plane of that inspection service. It is recognized that the Bureau of Animal Industry is one of the most efficient in the Federal Government. The cost for inspection is remarkably low, about seven cents per carcass, including laboratory tests. It might be still lower if the inspection service were broader. There has never come
to my attention any matter of corruption or bribery in that Department. One reason for this splendid record is that the government defrays the entire expense of this inspection. No inspector is dependent upon any fee from the house he is inspecting. No one can ask a favor of him. He is thoroughly impartial. He is as independent as an honest judge.

Let me summarize what meat inspection is costing in the State of Washington at this time and what the consumer is receiving:

Seattle alone, under the revised license schedule and the per carcass charge for grading, is receiving and spending approximately $45,000 per year for inspection and grading. Seattle represents less than one-third of the population of the State. Packers who are voluntarily accepting State inspection are paying the State and the State is spending about $60,000 per year. The several cities of the State, besides Seattle, are collecting license fees of approximately $10,000 per year.

In other words, there is being spent in excess of $115,000 per year for meat inspection in the State of Washington and much of this inspection would be considered completely inadequate as tested by Federal standards of inspection and, yet, in spite of this expenditure, 97 of the 143 slaughterers in the State are going entirely uninspected. A substantial amount of farm-killed animals are going into consumption through string butchers and roadside sales. Legitimate business is suffering. Legitimate business is not getting its dollars worth for the money it is paying. The public health is endangered. The consumer is not getting adequate protection.

What is the condition in the rest of the country? What I have described is occurring in practically every state in the Union, except California. The inspectors in the State of California are rendering a real service to the citizens of that State. They are doing a thorough job of inspection. Every
state would do well to investigate and follow the lead of California, if that is the real remedy to the situation.

I contend we could well afford to go back to the literature that shocked the country about the turn of the century and reread the articles that were then published describing the conditions that existed in the meat industry in Chicago and other producing centers, when Theodore Roosevelt, Senator Beveridge and other progressive leaders formulated and put upon our National statutes the meat inspection law. The national packers quickly realized the appalling condition as to plant sanitation and unwholesomeness of meat products. There has never been a serious challenge to the validity of the national meat inspection law. It is to the credit of the national packers that they cleaned house thoroughly. Probably the consumers in the United States have suffered because the packing industry made such complete about-face as a result of the national disgrace that was aired at that time. I say this because there is a false belief abroad that all meat consumed by the public is inspected. It is astonishing the number of people who do not realize that they may purchase in many markets meat which is killed under as filthy conditions as existed in Chicago before Sinclair and the other muck-rackers brought the scandal of the Chicago packers before the people.

Secretary Wallace in January, 1938, wrote to Senator Bone that there was a real need for inspection of meat producing animals which are not now subject to the provisions of the Federal meat inspection act. He suggested the passage of a bill then before Congress—H. R. 8047, which would “materially restrict the interstate trade in meats which may be conducted under the sections of the law which exempt farmers from the provisions of the act.” The Secretary pointed out that at least 35% of the meats consumed by the public are inadequately inspected. Dr. Koen at the Forty-second annual meeting of this body estimated 160,000 carcasses avoided condemnation annually which should be condemned, if adequate inspection were maintained.
It is self-evident that the owner of a diseased or ailing animal will not dispose of it to a Federal inspected house. He will bootleg the carcass. He does not care whether you or I suffer.

The last legislature of the State of Washington appropriated $450,000 for the eradication of Bang's disease and tuberculosis, which was matched by a Federal appropriation. I do not criticize this appropriation. I heartily endorse every effort to eradicate disease in live stock, but would it not be far better to take some portion of these appropriations to safeguard human health? I earnestly contend that all of these diseased cattle should be slaughtered in Federal inspected plants where we know that the offal is put in condemnation tanks and destroyed and where adequate sewerage facilities carry off the contamination, where adequate live steam and antiseptics can destroy the disease germs. I have witnessed the slaughtering of condemned cattle in and about Seattle where the tuberculosis offal has been fed to chickens and thus may have been communicated to humans. I have witnessed the drainage from such plants contaminating dairy herds. We have in the City of Seattle at the present time a judgment for personal injuries which is traceable to exactly this situation. I become wrathly when I see these enormous sums being spent for the eradicating of disease in animals and, yet, know that our lawmakers are neglecting human health by refusing to enact an adequate inspection bill.

The live stock men of America are suffering staggering annual losses through commercial thievery. The truck has not been entirely a blessing. Secretary of Agriculture Robinson of the State of Washington has stated that in our State alone the loss through thievery amounts to $200,000 per year. The larger cattle raising states, no doubt, suffer many times this loss. Just as the farmer with a diseased cow attempted to bootleg the cow through string butchers, so the thief will kill the stolen steer beside a slough, destroy the hide and identifying marks, and bootleg the animal. The sooner we can bring all killing under a national inspec-
tion law the sooner we will eradicate and eliminate this national racket. The sooner we do that the better it will be for every legitimate businessman and every live stock producer, who of all people should desire a national inspection law.

What can we do about the inspection of meats? What is the remedy? I suggest four principal thoughts:

1. California has pointed out one way. State inspection is far better than municipal inspection. Unless we can secure a national act, every state should attempt to follow the lead of California.

2. If state inspections are to be encouraged, I would strongly urge that the Federal Government take the lead and enact legislation in aid of state inspection. This legislation could be modeled after our Social Security laws and should provide that states which enact laws satisfactory to the Federal Government and establish adequate standards of inspection would receive appropriation from Congress to be matched by the state appropriation and thus the financing of the state inspection could be accomplished and the plane of the inspection would have to be maintained or the Federal support would be denied. This might well be the solution.

3. I, however, contend that the real remedy is to provide a national inspection act, which would protect the health of the citizens of the United States by broadening inspection throughout the nation. I have said sufficient to indicate what this would accomplish in protecting our citizens against diseased, unwholesome meat and fraud and commercial thievery. Can such a law be sustained under the Federal Constitution? It is my conviction that it can.

Over one hundred years ago the Supreme Court said that there were no limitations on interstate power except those expressed in the Constitution in plain terms. Before the Constitution, the Colonists, through their police power, could protect their citizens from unwholesome food. They surrendered the power over interstate commerce to the National Government in a complete way. If it is necessary or proper to protect interstate commerce in wholesome foods from the demoralizing effect of intra-state commerce in wholesome food, then Congress must have the power and authority to require a nation-wide meat inspection law. When the constitutionality of the National Pure Food Act was before the United States Supreme Court the court said that Congress had ample power to enact the law. Congress could keep the channels of commerce free from the distribution of illicit or harmful articles. Congress could
make such articles as are injurious to the public health outlaws to commerce and could bar them from the facilities of commerce. In 1884 Congress enacted a law under which the Secretary of Agriculture was authorized to make regulations to prevent the spread of disease among animals. The Secretary made regulations which permitted inspectors of the Bureau of Animal Industry to supervise the testing of live stock to prevent the spread of Splenetic Fever, although the live stock was not in transit between the various states. This Act and the regulations were upheld by the Supreme Court. The Stock Yard Act of 1921, the Grain Future Act of 1922, the Wagner Labor Relations Act, the Anti-Trust Law, the Guffey Act and Social Security Act all show that the impact of intra-state business may justify the regulation by the Federal Government of intra-state business in order to protect the interstate business which the Federal Government is attempting to foster.

I recognize that it may be wise if such a law is enacted to provide less stringent regulations for the operation of the small community slaughterer than are now required by the Bureau of Animal Industry where meat products go in interstate commerce. This, however, is a detail which need not be considered here.

4. In the fourth place, I insist that any meat inspection program, to be really effective, should be financed by general appropriation. First, I believe this has proved to be the strength of the Federal Inspection Act. In the next place, every effort should be made to encourage the consumption of wholesome meat. Whenever you place the inspection fee on the slaughterer and live stock producer consumption is curtailed by the effort of the industry to pass the tax on to the consumer. Oddly enough, experience shows that our citizens and legislators will fight over fees and forget entirely the fundamental necessity of protecting the health of the public.

By a national meat inspection act we would eliminate all of the local bitter barriers which have been built up between cities. We could eliminate frauds that are being perpetrated on the consumers. We could take out of our retail markets unwholesome meats. We could block the outlet for stolen cattle. We could eliminate the danger of corruption that is inherent in the present fee system of inspection.

Certainly, the health of our citizens justifies such legislation. Clearly, the cost of the service would be less than the charges that are now being levied by local ordinances and state laws. Who could object to such a law? Only the man who fears he cannot dispose of some sick cow or stolen steer.

Man is a meat-eating animal. Meat is his dominant food. It should be his safest food. If we are to encourage him to consume
meat, it is our duty to make it wholesome and appealing to him. Let us take meat inspection out of petty politics. Let us make meat inspection a Federal law. Sixty-five per cent of the meat is now Federal inspected. Let us make it 100%. Let us not allow the uninspected 35% to befog the splendid record of our Federal inspection service. There is no group in the nation who could benefit so much from a nation-wide inspection service as this group. You should sponsor such a program and work unceasingly to enact such a law.

MR. RINGER: I just want to point out one thing, the difficulty in getting inspection bills passed is because people are not informed as to what inspection is. (Applause.)

PRESIDENT AXBY: It is obvious that Mr. Ringer has given considerable thought and a great amount of time to the preparation of the actual facts of problems that may concern every sanitary official in his respective state.

PRESIDENT AXBY: As announced to you awhile ago by Dr. Schalk, the next item on this program is one that will be delivered by Dr. Robert Harkness. He is director of the Barry County Health Unit, of the W. B. Kellogg Health Foundation. He is also Colonel of the Medical Reserve Corps of the United States Army, Past Department Commander of the American Legion. Without doubt it is very obvious that he has some message, a man of such qualifications. It is a pleasure to present Dr. Harkness at this time. Dr. Harkness. (Applause.)

THE KELLOGG FOUNDATION

By DR. ROBERT B. HARKNESS, Director, Barry County Health Unit, Michigan.

I think it is wise to give you some picture of the Kellogg Foundation, which you may have heard of or may know. There are in this country a great many foundations, and, of course, the two Rockefeller foundations are at the top with a perfectly tremendous amount of money at their command, and the third one is the Carnegie and the fourth one is the W. G. Kellogg Foundation, which has been established as a rather unusual experiment in public health.

The background of it is what? It is not in a certain number of vaccinations done or examinations done. It is to
educate people to want those things and know what they mean, and what they are about, and with that end, instead of sending doctors in to do examinations, and dentists and veterinarians, all of this work, all of the doctors' and dentists' work, is done in the doctors' offices and the doctor is chosen by the people themselves. That started out very well, and we found to begin with that there was an unequal ability among the doctors. A great many of the doctors were inadequately prepared and numbers of them had been out of practice for a long time, and therefore were not up to accepted practice.

To correct this situation we arranged for some post-graduate courses. The first one was at the Cook County Hospital, and we sent all of the doctors in the county to the course. It was carefully prepared and covered the ground that they were most apt to be working in during the following year. This included vaccinations and all of the immunization processes.

The course, examinations, etc., were paid for by the funds of the Foundation. The doctor paid the Foundation back in this manner: When a child was brought into his office it was nearly always accompanied by the parents. The doctor explained to the parents, if the child was too young, the object of the vaccination. He told what we hoped to do, why an examination should be undergone, ever so often, why prevention against smallpox was desirable, and how it was accomplished. The doctors did the same for diphtheria and some of the other things.

It worked out very well. The doctors have had courses now for seven years. They have been held at Cook County, Michigan, Northwestern University, Chicago University, Harvard, the Mayo's, University of Buffalo, and the University of St. Louis. All of these have been carefully arranged courses and parallel something that would come up later.

With the dentists it was found necessary to do the same type of thing. They needed to equalize their professional
ability. So a development took place in dentistry which is of interest to everyone. First it was found that the children of about two years of age were the persons upon whom dentistry should be done first. The method of detecting that is very unusual. It is a story in itself. It is accomplished by X-rays which cost about ten or fifteen cents each. The X-rays take ten or fifteen minutes. If teeth are decayed the dentists fill the tooth. If teeth are taken care of at an early age, dentists figure the child should go through life at an annual expenditure of about a dollar a year. It is an interesting story and one that I find difficult to leave, but it is another story.

Teachers were in the same category with the doctors and dentists. There are approximately two hundred teachers in my county. Nearly all of these teachers have had the opportunity to go somewhere for post-graduate work. They have been to summer schools all over the country, and the manner of equalization of work, and information has worked out even though the teachers have been scattered, and not at one school.

This all sounds like a fairy story but it has aroused an amount of antagonism among certain men who are rather hidebound in the matter of public health activities. However, this has not particularly affected our progress and, these men are nearly all coming around to certain modifications of the plan. Detroit follows the plan, and several of the eastern Foundations are now doing practically the same thing.

The advantages of giving instruction are endless. We have sent nearly all of the ministers away to a psychologist in Chicago, who has established a course for them in pastoral psychology. The courses do more than increase knowledge. They have built up a feeling of friendship and cooperation among the various groups.

I think the fellowships, that elicited the most comment was one for the janitors of school buildings. Now to send janitors of school buildings away on a scholarship sounds
absurd, but our county men were sent up to Michigan State College. The men at Michigan State prepared for them a very excellent course. They put a lot of work on it. They were only up there for a few days. They were taught about air conditioning, floor treatment, lighting, heating and heat control. The net result of this was that the men who went up as janitors came back as custodians. In this country if you refer to somebody who takes care of a school, you want to call him a custodian and not a janitor. He is a qualified person. A number of these men during the winter after their course saved enough on coal to pay for their training.

We found another difficulty with the teachers. The teachers were educated in current processes, and that is not as slight a thing as it seems. So many things that were current when many of us were in the primary grades are completely out of date. The child nowadays, who is well trained, reads about twice as fast, and retains what is read. He has concentration, speed, and a lot of things that we never even suspected.

A neighboring county had a very intelligent teacher who had benefited by such training. However, her school officers regarded her methods as foolish and would not stand for it. So one of the best teachers in the county was fired. It was obviously desirable to send these school officers off for a trip and we did just that. We sent them to the University of Chicago for some training in school technique, and they came back pretty happy. All except six supervisors have taken the course. The remaining six will be going next month.

We thought it might be a good thing to send the policemen to school as they have a great amount of work with delinquent children. This type of work is a tremendously important thing. Well, I was very much amused. Next Hallowe'en the training gave results as the policemen started to apply the psychology they had been taught in the school. The police arranged activities for the boys and it was midnight before the boys knew that they had been misled. The police do it every year now—apply psychology and save damage to property.
We are not quite the perfect organization we sound. However, nobody in the world is perfect. This work is certainly appreciated by the county. Three months ago we asked for a ballot throughout the county to see whether or not they wanted to continue the health department on the same basis. It would have been perfectly easy to send out a post card and just simply ask “Yes”, or “No”. Even at best you would get about fifty per cent of them back. We sent them out with this proviso: “If you think the Health Department should be continued on the present basis, do you think it should be continued if you have to pay twenty-five cents more per capita for it?” So it is a very pleasant thing to tell you what the answer was to the questionnaire. The people returned 8450 questionnaires out of a possible 9200, and the number against continuing the plan was one and three-tenths per cent. So we felt that the people in our county were satisfied with what was going on.

We have been accused by health departments of doing different things. We have a per capita of $2.50. For every person in the county we are able to spend $2.50 each year on public health. The average in the State is high, as compared with other states, but it is only 57 cents. Now then we have been accused of being haughty about this state-of-affairs. As a matter of fact, we are far from it. We have been fortunate enough to have a lot of money placed at our disposal for a very important experiment. It is to do things for people, to see if the plan will work out as a permanent public health effort. If it does work out, we will be completely delighted. If it fails, then somebody has been generous enough to put up forty-six million dollars and wagers it on the success of this plan. So far the plan certainly gives every evidence of being a success in the seven counties that are applying it.

It is so much of a success that I think we are averaging two visitors a day in the community. Up to the time of the beginning of the war, we had them from practically every country on the globe. It is no unusual thing to have somebody come in from China, and only the day before yesterday,
a woman flew in from Australia and spent two or three days with us just looking over the records of our work.

I am talking to you as veterinarians and where do the veterinarians come into this program? It is a very pleasant story. We realized early in the program that the veterinarian was an important person in our program. He is very close to the people, he has plenty of time to do what he wants to do. I have learned a lot from the veterinarian. He does not hurry. He goes into a family, and gains their confidence. The first visit I made, where there was a veterinarian, had this actual result, and it was very funny to me. We sat down outside a little two room house and talked to the farmer and his wife—intelligent, agreeable people.

The veterinarian said: "How is Mary, Isabelle and Janet?" How is so and so. He gave a detailed history of each one of them. I kept thinking: "How in thunder do all those people live in that little two room house." Then I found out he was discussing cows. He knew the name of every cow that belonged to those people, and their history. It was serious business as the most important thing to that family was their cows. They depended upon their cows for their livelihood. So that conversation about the cows was the most important item of conversation. It was entirely my own fault that I had misjudged the matter.

That, incidentally, was the woman about whom they told this story. One of our nurses went in to see her after she had reported that she was going to have a baby, and asked her the probable date? "Did the doctor know about it?" "Had he seen her?" "Had the nurses seen her?" "Were the preparations all made?" This maternity business is an important part of our organization. The woman said, "Well, I am not sure. Wait a minute." She fumbled around with the calendar and said, "Oh, here it is, August 14th." Then she said, "Oh, no, that is the cow. I forgot to mark mine." (Laughter.) That indicates the relative importance.
Now, then, if the veterinarian is our advisor, and he is, we consult with him. The medical profession and the veterinary profession—this was a surprise to me and it will be a surprise to many of you—touch each other absolutely on thirty diseases. There are thirty diseases in which medical and veterinary professions touch each other, and consult seriously with each other. I would say that there is never a week that I do not consult with some veterinarian about a joint interest in some disease. During the past ten days we have had two cases of tularemia, and, of course, we always have rabies. Those diseases are all turned over to the veterinarian for care.

Some of the thirty diseases are the desperate ones. Examples are rabies, tetanus and tularemia. The veterinarian is at the front in the fight against these diseases and he occupies a prominent position. The family has come to accept the recommendation of the veterinarian. The families in my rural communities believe in the veterinarian. You can talk your head off about various procedures, and if the veterinarian says "No," then it is "No." However, if he says "Yes," then everything is fine. Therefore, he is one of our major considerations.

However, many of the veterinarians were men who had been out of school for many years, and had lost track of current procedure. It was desirable to arrange post graduate work for them. The first effort was at Michigan State College. They arranged it. We did not know how it was going to work out. However, it worked out beautifully. Forty men from our area went for the sessions, and they organized an association of their own and asked for additional post graduate work.

We had a spring meeting with some prominent outside veterinarians present and it was successful enough to make us feel that we should go on with this program. A little later we had a combined meeting of the medical men and the veterinarians. Dr. Merchant, of Iowa, came to talk on the diseases significant to both veterinarians and medical
men. Dr. Smiley, then of the Harvard School of Public Health, talked on a similar subject. The meeting was successful. We now have a combined meeting every year.

I must explain to you that I have had a degree conferred upon me. I became a veterinarian. It occurred very suddenly and you men who have worked for your degree may or may not accept it as a proper procedure. Dr. Johnson, of the New York State Veterinary College, came out to do some extension work on demonstrating mastitis in various herds. He traveled from county to county, and I enjoyed going to several of them with him. In one of these counties there was a veterinarian who did not approve of my being around. I was a doctor, a common garden variety M. D., and he labeled my being around as merely a kind of pretense at knowledge of veterinary work. At any rate he did not like me around. He was a veterinarian by virtue of having declared that he was a veterinarian. I was just as much of a veterinarian as he was, I thought.

He finally showed me a very exhausted cow that had tremendous udders. He said, "There, what do you think that is, Mr. M. D.?” I said, “That looks to me like mastitis.” He said, “Yes, it is mastitis, and what treatment would you recommend?” “Well,” I said, “The only thing I can think of offhand would be a very stout brassiere.”

Well, the other fellow seemed to think that was all right. A week later I came in to a club house after a game of golf. A fellow yelled: “Hey, are you Dr. Harkness?” I said, “Yes.” He said, “Are you the inventor of a very recent unusual procedure in veterinary technique?” I said, “Oh, you mean about mastitis?” He said, “Yes.” I said, “Oh, yes, I discovered that. That is mine.” He said, “Come on down here. We are going to make you a member of the Veterinary Society. There are four of us here.”

They were at the far end of the bar. (Laughter.) They had a start and when the smoke cleared away I was a veterinarian. It always seemed to me to be perfectly
legitimate. I accept it as a real degree, and they have not backed down on it. They, I might say, have renewed it several times. (Laughter.)

We arranged for the veterinarians to take care of herds just as we did for the dentists, and the medical men to take care of children. That went on for only a year. Somebody discovered there was something in the Bill of Rights of our organization plan that did not permit such work because there were no children. We had a big battle about it, but they beat us. However, the veterinarians have been having their post graduate work and their lectures.

The veterinarian in the last few years has come into his own. I was at the S. P. C. A. in Boston last Christmas and saw an astonishing thing. Animals in a hospital with white robed nurses and technicians making reports on leukocyte counts. I was tremendously impressed with the highly trained, scientific procedures being used. The whole of the veterinary profession is coming along on that basis. They are zealous for improvement. Veterinarians are following in the footsteps of the medical and dental professions. You now have the world by the tail and there is no reason why the veterinary profession should not progress to the status of the other scientific professions.

I congratulate you all upon being a part of an organization that has seen its goal and is going after it. (Applause.)

PRESIDENT AXBY: Doctor, we thank you very kindly. We are glad to have heard this dissertation on the Kellogg Foundation.

PRESIDENT AXBY: Since the hour is late, we will dispense with Dr. Coen's report until the first thing tomorrow morning.

PRESIDENT AXBY: We will commence tomorrow morning at nine o'clock. If there is no objection we will stand adjourned until nine o'clock tomorrow morning.

The meeting adjourned at 5:55 p. m.
THURSDAY MORNING SESSION
DECEMBER 7, 1939

Tuberculosis Session

The meeting convened at 9:25 a.m., President Axby, presiding.

PRESIDENT AXBY: The Association will be in order.

PRESIDENT AXBY: The Executive Committee at their first regular meeting, authorized the Chair to appoint a Nominating Committee. This I shall do at this time. The Nominating Committee will be composed of the following members: Dr. C. D. Stubbs, Dr. H. C. Givens, and Dr. H. A. Seidell. May I ask you to perform your duties so as to be able to make your report at the time of the election of officers on the last day.

We will now take up the program in regular order, and the first item on the program in this Tuberculosis Session is: "The General Tuberculosis Situation," by A. E. Wight, Chief of the Tuberculosis Eradication Division, Bureau of Animal Industry, United States Department of Agriculture, Washington, District of Columbia. It is my pleasure to present to you, Dr. Wight. (Applause.)

THE GENERAL TUBERCULOSIS SITUATION

By DR. A. E. WIGHT, Chief

Tuberculosis Eradication Division,
Bureau of Animal Industry,
United States Department of Agriculture.

In this report on the general tuberculosis situation, I will endeavor to inform this Association of the progress and status of the control and eradication of tuberculosis in live stock, including poultry. Similar reports have been given to this Association annually for about 12 years by the speaker, and during that time there has been much progress in connection with this work. It has been a happy occasion each year to be able to make reports of substantial gains.
This year the report, as far as the bovine tuberculosis is concerned, can be rather brief because the greater part of the work of tuberculin testing of cattle has been retesting in the States and Territories in which all the counties are in the modified accredited area. As a result of applying approximately 10,000,000 tuberculin tests in these areas during the year ended June 30, 1939, about 33,000 reactors were disclosed. This shows an infection of approximately 0.3 of 1 per cent, or three reactors out of every 1,000 cattle tested. During the same period it was necessary and possible to remodify 1,048 counties throughout the United States as well as one municipality in Puerto Rico. It is gratifying to report that the results of the retesting of cattle have made it possible to continue these counties and municipalities in the modified status.

Opposition to bovine tuberculosis eradication is comparatively small, but delays caused by litigation of a group of opponents in California have made it impossible to complete the work to a point where all the counties could be classified as modified tuberculosis-free areas. However, 8 counties in that State have been modified during the 12 months ended November 30, leaving only 6 counties in the central part of the State not in the modified area. Recent reports from that State indicate that the initial testing of all herds of cattle has been accomplished. It was our privilege last year at this meeting to listen to Dr. C. U. Duckworth, chief of the Division of Animal Industry of the Department of Agriculture of California, who gave a most interesting and comprehensive report of the work done up to that time in the eradication of tuberculosis among cattle in that State. It is hoped that he will be able before this session closes to give us a little more on this subject so that it may be added to the record of his excellent report last year.

The total number of tuberculin tests applied during the fiscal year ended June 30, 1939, was approximately 11,185,000. About 60,000 reactors were disclosed, or approximately \( \frac{1}{2} \) of 1 per cent, which was the lowest degree of infection found in any year since the beginning of the project in 1917.
The officials and workers cooperating with the cattle owners, as well as all others who have made it possible to have this great amount of work accomplished, are to be highly complimented.

**State and Federal Funds**

The combined state, territory, and county funds made available for this work, during the last fiscal year, amounted to approximately $4,000,000, which included indemnity and operating expenses. The amount of Federal funds used for the same purposes in the work was approximately $2,800,000.

**Accredited Herd Work**

The records of the United States Bureau of Animal Industry indicate that on November 1, 1939, there were approximately 262,500 fully accredited herds, containing about 3,829,000 cattle, in the tuberculosis project. This is about the same number of accredited herds reported during the last two or three years. While it is true that in some states there is not much interest in the accredited-herd feature of tuberculosis eradication work, in other states there is considerable interest, especially among owners of herds composed of registered purebred cattle. The largest number of accredited herds of cattle continues to be in the State of New York, where the retesting of such herds is conducted by the local practicing and accredited veterinarians at State expense.

**Area Work**

As usual the greatest volume of work, as far as the tuberculin testing of cattle was concerned, was conducted under the area plan, the ratio being about 9 cattle tested under that plan to 1 under the accredited-herd plan. All the municipalities in Puerto Rico were placed in the modified accredited status by January 2, 1939. The work in that Territory continues to be conducted in cooperation with the Department of Agriculture and Commerce of that Island.
As a result of testing all the cattle in the Virgin Islands, disclosing no reactors, all three islands have been in the modified status since December 1, 1938.

**Cattle Tuberculin Tested for Interstate Shipment**

During the last fiscal year tuberculin tests were applied to approximately 195,000 dairy or breeding cattle intended for interstate shipment, according to the records furnished to the Bureau of Animal Industry. Of this number only 22 reactors were reported, or 0.01 of 1 per cent. These tests were made in order to comply with State requirements in connection with the interstate movement of cattle.

**Avian Tuberculosis**

The efforts to control and eradicate avian tuberculosis, which is readily transmitted to swine, have been continued. During the last fiscal year the veterinarians who have been engaged in the tuberculin testing of cattle in states where there is considerable infection of the avian type made observations of approximately 98,000 flocks and they reported infection on about 3,300 of these farms. In 9 of the Central and North-central States, veterinarians assigned to the avian tuberculosis work observed approximately 10,000 flocks of poultry, containing about 1,300,000 birds. These veterinarians applied the tuberculin test to quite a number of these fowls, locating about 6,200 reactors. These veterinarians also applied tuberculin tests to swine on many farms during the year. They found that a higher percentage of swine reacted to the avian tuberculosis than to the mammalian type.

Tuberculosis of the avian type continues to be very prevalent in many localities in the Central and North-central States, but it is considered that progress is being made in its control and eradication. At the meeting this afternoon there is to be a special report on this subject by a Bureau veterinarian who is in a position to furnish much information on this important subject.
The results of studies of this problem by Dr. W. H. Feldman, of the Mayo Foundation, which have been published together with other material on this subject, have been very helpful to the workers engaged in this project and have served as a basis for many highly informative articles. It is gratifying to note that he is to appear on this program today. The cooperating agencies, such as the Institute of American Poultry Industries and the National Live Stock Exchange, have also contributed much to the avian tuberculosis program during the past year. The work done in cooperation with the owners of a number of large commercial hatcheries in some of the states has proved to be very satisfactory.

Post-Mortem Results Show Less Tuberculosis of Cattle and Swine

The records of the Meat Inspection Division of the United States Bureau of Animal Industry indicate that there continues to be a reduction each year in the number of cattle showing any lesions of tuberculosis on post-mortem examination. During the last fiscal year there were slaughtered approximately 9,500,000 cattle at establishments operating under Federal supervision. Of this number and exclusive of known reactors to the tuberculin test, about 10,000 showed some evidence of the disease. This is about 0.1 of 1 per cent of the total. At this point it is interesting to observe the great reduction in the number of retentions of cattle showing any evidence of tuberculosis since 1920, when out of approximately the same number slaughtered, there were 157,000 cattle that showed some evidence of this disease. Of the total number of cattle, exclusive of known reactors, showing any evidence of tuberculosis upon post-mortem examination, about 2,400 were either condemned as unfit for food or passed for cooking under Federal supervision. This is approximately 0.025 of 1 per cent of all the cattle slaughtered under Federal supervision, exclusive of known reactors, during the last fiscal year.

The reports received in regard to the post-mortem inspections of swine at establishments operating under Federal
supervision indicate that the percentage of those showing any evidence of tuberculosis was slightly less than during the previous year. Out of approximately 38,600,000 slaughtered under Federal supervision, 3,400,000, or about 8.8 per cent, showed some evidence of tuberculosis. Of the total number of hogs retained for tuberculosis, about 28,000, or 0.07 of 1 per cent of all those slaughtered, were either condemned as unfit for food or passed for cooking under Federal supervision. This is slightly less than the percentage that was reported during the previous year. All the remaining hogs that were retained for further inspection were passed for food purposes after the slight lesions in them were removed under the supervision of employees of the Bureau of Animal Industry.

The location of centers of infection of tuberculosis among cattle and swine has been made possible during the past year because of information obtained at the packing centers where infected animals are discovered. This feature of the work is a very valuable one. There are a number of instances during the year when some infection has been found, and this illustrates very clearly the value of these reports that are furnished by the Meat Inspection Service.

**Appraised Value and Salvage**

The average appraisal of cattle reacting to the tuberculin test during the last fiscal year was about $89.00, and the average salvage was $34.50, about $2.50 more than the average amount of salvage received by the owner during the previous fiscal year. The combined State and Federal payments received by the owners of tuberculous cattle amounted to an average of approximately $35.00, which is about the same as that received last year. Of the total cattle and reactors that were slaughtered, 5 per cent were pure bred and registered. The method followed in making the Federal payment has been the same as during the previous fiscal year.
Publicity

Publicity, as far as the control and eradication of bovine tuberculosis are concerned, is, of course, not so important in connection with the future work as it has been in the past. However, it is advisable to call attention to the importance of what has been accomplished as well as to the desirability of continuing the tuberculin testing in order to locate and clean up any remaining infection of this disease. At the World’s Fair held in New York City this year, it was possible to have a good description of the progress and accomplishments in bovine tuberculosis eradication in an exhibit sponsored by the American Veterinary Medical Association. The Department has made available a large number of film strips containing about 50 pictures on the subject of tuberculosis in live stock. This pictorial matter is especially adapted for use in connection with meetings on avian tuberculosis in poultry and swine. The film strips are very convenient, due to their size, and in many of the counties throughout the United States, projectors are available for their display. More copies can be obtained from time to time on application to the Extension Service of the Department of Agriculture, the cost being about 45 cents each. The motion picture film that was prepared by the Department several years ago on the subject of avian tuberculosis has been revised, and copies are available in both the 16 and 35 mm. widths. This picture requires about 20 minutes for projection. The public press has been very helpful to this branch of the disease control work in publishing from time to time articles on the subject.

Johnes Disease Or Paratuberculosis

During the last fiscal year Johnes’s disease was reported, by either State or Bureau veterinarians, to exist in 16 different states, and there were 321 cattle, out of a total of 3,560 tested for this disease, that were classified as reactors. This is approximately 9 per cent of the total number tested. These reactors were found on about 100 different premises. As stated in my report to this organization last year, it is
hoped that the work to be conducted at the new Federal Animal Disease Laboratory at Auburn, Alabama, will serve to be of much assistance in the control and eradication of this disease, which is quite a serious problem in certain parts of this country.

**Personnel**

The State and Territorial authorities employed an average of about 300 veterinarians throughout the year, and the counties employed about 162 veterinarians on full time. In the Federal service there were about 290 veterinarians engaged in the work, including those working on a part-time basis.

**Conclusions**

Within the next few months it is hoped and believed that all the remaining counties in California will be placed in the modified tuberculosis-free area and that will mean that the entire list of counties in the United States, as well as all municipalities in Puerto Rico and the Virgin Islands, will be in that status. The follow-up work in these areas will have to be continued for a considerable time, and special attention must be given to sections of the county where the disease existed to a very great extent. The follow-up work on reports received from packing centers will be very helpful in connection with future activities in the control and eradication of bovine tuberculosis.

This report includes some statistical material, but more complete data on the subject are contained in a special statistical pamphlet, copies of which are now available. If anyone desires additional copies, they may be obtained by addressing the Bureau of Animal Industry, Washington, District of Columbia. This pamphlet also contains some results of testing cattle for Bang's disease.

At this time I wish to again express my appreciation of the splendid cooperation that has been rendered by the various live stock sanitary authorities with whom we have cooperated during the past year. I also wish to have all the
employees who have been identified with this project know that their efforts and good work continue to be of greatest importance in reducing the incidence of bovine tuberculosis. Live stock owners, live stock commissioners, and many others, in addition to the public press and the radio, have contributed much to the progress of this great work during the last 12 months.

PRESIDENT AXBY: In accordance with the constitutional provision, this report will be referred to the Executive Committee. Every year we come here and have the assurance of receiving from Dr. Wight the last word on tuberculosis eradication, and the situation generally up to this time, and we are very grateful to again receive this report from Dr. Wight.

The next item on the program is: "The Pathogenicity for Cattle of the Avian Tubercle Bacillus." This is illustrated and will be delivered by Dr. Feldman, Mayo Foundation, University of Minnesota, Rochester, Minnesota. We have become accustomed to listening to Dr. Feldman on previous occasions, and only from the amount of interpretation given heretofore, it is a very great pleasure for me to present on this occasion, Dr. Feldman. (Applause.)

DR. WILLIAM FELDMAN: President Axby, and members and guests of the United States Live Stock Sanitary Association: In the title of my paper, I seem to be listed as the single and only author. Inadvertently, my former colleague, Dr. Karlson's name was left off. Much of the information that we have here in this paper was secured through the industry and interest of Dr. Karlson.

THE PATHOGENICITY FOR CATTLE OF THE AVIAN TUBERCLE BACILLUS

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and

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Since 1917, when the program for the eradication of bovine tuberculosis began, more than 220,000,000 cattle have been
tested with tuberculin under the supervision of the Bureau of Animal Industry. Among those tested in this stupendous total were approximately 3,700,000 that reacted positively to the test and were subsequently slaughtered. The wisdom of this plan of action is now clearly apparent, for the United States has all but eliminated a major infectious disease from its most important domestic animal.

When the eradication program began there was no question as to which of the three types of the tubercle bacillus was responsible for the disease. The bovine form of the organism was and in all probability still is the infective agent in the vast majority of cases. However, as the sources of the infection were gradually but very definitely eliminated by the "test and slaughter" plan, two facts became apparent. First, as was to be expected, the incidence of infection as indicated by the tuberculin test diminished and second, it became increasingly difficult at the post mortem examination to demonstrate lesions that were definitely those of tuberculosis or even lesions of any kind. This is the situation at the present time and the problem presents an interesting field for the investigator who would attempt to explain convincingly why cattle may react to tuberculin yet fail to present at necropsy satisfactory evidence of a tuberculous infection.

Cattle, generally speaking, are strongly resistant to infection with avian tubercle bacilli; yet they are capable of being sensitized to mammalian tuberculin by this type of the tubercle bacillus. Consequently, it is only reasonable to believe that some at least of the so-called non-visible lesion reactors are probably infected to a minimal degree with the organism of fowl tuberculosis. That this is not a fanciful notion is now generally accepted. There exist a goodly number of reports containing acceptable proof that avian rather than bovine tubercle bacilli have been responsible for the lesions found at necropsy in certain cattle that had reacted to a routine tuberculin test. The exact status of this problem has by no means been established. This is especially true of the situation in the United States where no investigations that were really comprehensive have been carried out.
We do not wish to imply that any considerable percentage of the so-called non-visible lesion reactors can or are likely to be explained on the basis of infection, or tuberculin sensitization with the avian tubercle bacillus. Instead we only wish to emphasize that this form of the tubercle bacillus does occasionally infect cattle and that, in cattle from regions where opportunity for infection with avian tubercle bacilli exists, this organism should be given serious consideration in explaining slight, non-progressive lesions and sensitivity to tuberculin, providing infection with bovine tubercle bacilli is unlikely.

Tuberculosis is a disease of inconsistencies and one should avoid a dogmatic position regarding many phases of the disease. For example, it was assumed for many years that generalized tuberculosis in swine is usually due to the bovine type of the tubercle bacillus, yet it is now known that the avian type of the organism is very often responsible for generalized tuberculosis in swine. Again, it has been assumed that pulmonary tuberculosis in the human being is practically always due to human tubercle bacilli, but recent studies in England and Denmark have shown that the bovine type of the organism may not uncommonly be responsible for pulmonary tuberculosis in human beings. These two examples should serve as reminders that each of the three types of tubercle bacilli may and often does affect heterologous hosts and we should reserve our opinions concerning the type of the organism responsible for lesions in mammals until satisfactory data are established by accepted laboratory methods.

**Sensitivity of Cattle to Tuberculins**

Although it has been definitely shown by several investigators that cattle will usually become sensitized to avian tuberculin following their exposure either naturally or experimentally to avian tubercle bacilli the reports available indicate that the reaction to mammalian tuberculin is inconstant.

*The question of the sensitivity of cattle to homologous and heterologous tuberculins is considered in detail in the monograph by Feldman.*
This problem was studied rather comprehensively by Schalk, Roderick, Faust and Harshfield at the North Dakota Experiment Station. From the results obtained from several experiments in which a large number of cattle were exposed experimentally to virulent avian tubercle bacilli, they concluded that a positive reaction to mammalian tuberculin as this product is applied in the routine testing of cattle, in animals without demonstrable gross lesions of tuberculosis, cannot be explained on the basis of a previous exposure to avian tubercle bacilli.

Although the data obtained by Schalk and his co-workers adequately support this conclusion, in so far as experimental exposure to avian tubercle bacilli is concerned, there exist many reports that indicate that under conditions of natural exposure, cattle may become sensitized to mammalian tuberculin following infection with avian tubercle bacilli. Van Es and Martin obtained avian tubercle bacilli in about 10 per cent of the cattle in which there were lesions of naturally acquired tuberculosis. Most significant in this connection is the fact that of the eleven cattle in which avian tubercle bacilli were demonstrated, six had been sent to slaughter because of positive reactions to mammalian tuberculin. One of the animals was considered a non-reactor and the sensitivity to tuberculin of the remaining four was not known. McCarter, Hastings and Beach, Schlotthauer and one of us (Feldman), and the present authors have also demonstrated avian tubercle bacilli in bovine animals that had reacted positively to mammalian tuberculin.

By far the most impressive contribution to the subject of whether or not avian tubercle bacilli will sensitize cattle to mammalian tuberculin injected intracutaneously is the recent report of Plum' on work done in Denmark. In 170 cases of tuberculosis of cattle in which the type of the tubercle bacillus responsible for the lesions was determined by the cultural characteristics of the bacteria and the injection of guinea-pigs, avian tubercle bacilli were demonstrated in fifty-seven animals.
The protocols showed that bovine tuberculin had been administered to thirty-two and that a positive reaction was recorded for twenty-eight, whereas for four of the animals the results of the test were negative. It should be mentioned, however, that although the reactions recorded for the twenty-eight animals were of sufficient magnitude to enable the veterinarian to record the reaction as positive, the size of the local reaction as recorded by Plum' seems in most instances to have been much smaller than the typical positive reactions to mammalian tuberculin with which we are familiar in the United States. Perhaps we have been overlooking what may be an indication of the avian type of infection by failing to take cognizance of small, or what we consider insignificant, reactions to mammalian tuberculin in herds where bovine tuberculosis is not likely to be present but in which there exists exposure to avian tubercle bacilli.

In Denmark, the possibility of reactions to mammalian tuberculin being due to sensitization by avian tubercle bacilli is recognized as of sufficient importance to be considered in an official state regulation. This provides for the retesting of animals in which the avian tubercle bacillus is suspected of being the sensitizing agent with avian and bovine tuberculins injected intracutaneously in separate areas simultaneously. If the retest is done within one and one-half or two months after the first test, the type of the infective agent should be indicated by the tuberculin that elicits the most pronounced reaction.

Plum admitted that the interpretation of the reactions in such a procedure is confusing to some, but stated that, when done by one familiar with the history of the herd and possessed of adequate experience, the second test will generally indicate whether the avian or the bovine tubercle bacillus is responsible for the state of sensitivity. The data presented by Plum seem to justify this conclusion, since in 170 cases the results of the second tuberculin test and the results of the typing experiments showed a satisfactory correlation.
Stenius has reported recently on the specificity of avian and mammalian tuberculins as a means of indicating the type of tubercle bacillus responsible for tuberculin sensitivity in cattle. His results have confirmed the observations of others that cattle infected with avian tubercle bacilli may react to mammalian tuberculin. In addition, he found in such cattle that if both avian and mammalian tuberculins are injected simultaneously, the reaction to avian tuberculin will be the more severe. Stenius also found that among animals infected with avian tubercle bacilli and which react to avian tuberculin, only approximately one-third will react to mammalian tuberculin.

Whether or not we in the United States would be justified in following the Danish procedure and retesting with both avian and mammalian tuberculins is, of course, a subject about which there is much difference of opinion. Since we have subscribed to a program that we hope will eventually eliminate from our cattle all tuberculous infections, regardless of the type of tubercle bacillus, our point of view is probably at variance with that maintained in certain other countries where it may suffice to know that an animal is not affected with the bovine type of bacillus. However, one is not infrequently confronted with local tissue reactions following the injection of mammalian tuberculin that are extremely difficult to interpret with confidence, and it may be reassuring at times to know that avian tubercle bacilli may be responsible for the sensitivity.

The knowledge available at this time concerning the sensitization of cattle to homologous and heterologous tuberculins seems to justify the following conclusions:

1. Following natural or experimental exposure to avian tubercle bacilli, sensitivity to avian tuberculin develops in most cattle. In cases of natural exposure this sensitivity is usually transitory and eventually disappears if the animals are moved to a non-infected environment.

2. Occasionally, cattle sensitized under natural conditions will react rather typically to mammalian tuberculin. Plum's observations suggest that a definite reaction, but of substandard dimensions, occurs in the majority of cattle that harbor avian tubercle bacilli.
3. It seems not unlikely that in the United States the avian tubercle bacillus sensitizes more cattle to mammalian tuberculin than is generally recognized, and the possibility is suggested that at least some of the so-called nonvisible lesion reactors react to mammalian tuberculin as a consequence of sensitivity induced by avian tubercle bacilli.

4. In areas where tuberculosis of fowl is prevalent and the infective agent exists in excessive concentration, sensitivity due to the avian tubercle bacillus should be seriously considered in reacting cattle from herds in which it is reasonably certain that infection with bovine tubercle bacilli has not occurred.

**Infectivity of Avian Tubercle Bacilli for Cattle**

The ability of tubercle bacilli to invade the tissues and establish demonstrable lesions in a heterologous host is one of the most interesting features of these bacteria. Their ability to do this has, however, made a correct understanding of tuberculosis in different species of animals difficult to acquire and has complicated tremendously the control and eventual elimination of tuberculosis, especially from swine and to a less extent from cattle.

The infectiousness for cattle of avian tubercle bacilli following experimental exposure has been fairly well established. It is now recognized that cattle can be infected experimentally and that the extent and severity of the morbid changes depend on several factors such as the age of the animal, the route of inoculation, the dosage and the virulence of the particular strain of avian tubercle bacilli used. Young animals appear to be less resistant than old ones and they are easily infected by intravenous inoculation of the organisms. Subcutaneous inoculation is usually well tolerated, the resultant lesions being limited in most instances to the region of injection and the contiguous lymph nodes. If the infective bacteria are introduced by way of the mouth, lesions usually become established in the lymph nodes of the mesentery or the lymphoid deposits of the alimentary canal. Lesions may even develop in the intestinal mucosa.

Widespread, aggressive tuberculosis does not occur in cattle infected experimentally with avian tubercle bacilli
except in those instances where the infective agent is administered intravenously. In the latter instances the results are often fatal within a period of four to six weeks.

Since it has been established by experimental means that cattle do have a limited susceptibility to avian tubercle bacilli, it is reasonable to expect that infection may occur in cattle under conditions of natural exposure.

That abundant opportunity for natural exposure exists in certain areas of the United States is clearly evident to anyone who appreciates the prevalence of tuberculosis among the poultry flocks. The direct and indirect consequences of this disease are responsible for incalculable losses both to the swine and poultry industries and in considering heterologous hosts that may be affected one cannot escape the conclusion that cattle are probably affected more frequently than is generally believed.

The relatively few reports on the occurrence of avian tubercle bacilli in the tissues of naturally infected cattle may be explained in part by the inadequacy of the methods often employed in demonstrating tubercle bacilli from such tissues.

Since the bovine type of the tubercle bacillus is usually sought in tissues of cattle that have reacted to mammalian tuberculin, the usual practice is to inject guinea-pigs. This, of course, is a perfectly satisfactory procedure if bovine or human tubercle bacilli be present in the inoculum. However, if avian tubercle bacilli be present they are not likely to produce grossly recognizable lesions since guinea-pigs are essentially not susceptible to avian tubercle bacilli. For this reason rabbits as well as guinea-pigs should always be used in detecting tubercle bacilli that may be present in instances where the type of the infective agent is obscure. If this practice were universally followed, we would within a few years have a more accurate understanding of the prevalence of the infection of cattle with avian tubercle bacilli.

A summary of most of the reported instances in which avian tubercle bacilli were demonstrated in the tissues of cattle is given in table 1. A total of 103 cases is listed yet
only twenty-seven cases were reported by workers in the United States. These figures emphasize, it seems to us, the desirability of a sustained and comprehensive attack on the problem. Unfortunately, the number of investigators in this country who are seriously engaged with this problem are few. The project is badly in need of a stimulant if certain essential and significant facts are to be elicited. As Timoney in a recent paper points out, absence of recorded instances of infection with avian tubercle bacilli is no index of the true situation. Kelland, Frood and Doyle who recently reported three cases of avian tuberculosis infection in calves also recognized the possible importance of this problem by writing, "In view of the considerable incidence of tuberculosis in poultry flocks on general farms in Great Britain, there would appear to be good grounds for believing that avian tuberculosis in cattle may be fairly prevalent." Referring to the situation in the United States, Van Es stated some years ago that "tuberculous infection of avian origin is by no means uncommon in cattle..." Whether or not the avian tubercle bacillus is commonly responsible for lesions in cattle or is frequently the explanation for the sensitivity of cattle to mammalian tuberculin has not been definitely established. More information is needed and this can only be secured by further study.

Pathologic Anatomy Following Natural Infection

The information available seems to indicate rather definitely that following natural infection the avian tubercle bacillus has but limited ability to produce recognizable changes in the tissues of cattle. The severe, widespread and destructive changes that the bovine tubercle bacillus is capable of producing in cattle are apparently beyond the ability of the avian type of the organism. The tissues of cattle do not provide a suitable environment for avian tubercle bacilli. The organisms seem to lack the necessary invasive powers although they are capable, as Timoney stated, of a prolonged parasitic existence without necessarily producing macroscopic changes. When lesions occur they
are usually characterized by being localized, benign or non-progressive.

In so far as our experience indicates, there are no gross features that are essentially characteristic of lesions in cattle due to the avian tubercle bacillus. The lesions may consist of a single focus or less frequently of multiple foci that may be productive or caseous or caseocalcareous. Although lesions may appear to be those of tuberculosis, it is unwise to attempt to designate on the basis of the morbid changes which of the three types of tubercle bacilli is responsible for the lesions. This can be accomplished with confidence only by means of tests of pathogenicity.

With the exception of the cases reported by Plum in which the infection occurred in the uterus, the lesions in cattle due to avian tubercle bacilli have usually occurred in lymph nodes. In our cases the organism has been recovered from lesions in the retropharyngeal, the bronchial and the mesenteric lymph nodes. In the cases that have been reported previously the lesions have occurred most frequently in the mesenteric lymph nodes. This can probably be explained by the fact that natural exposure to the infective agent is usually by way of the digestive tract.

Although the information obtained from the cases that have been reported suggests that the lesions induced in cattle by the avian tubercle bacillus usually remain localized and quiescent, it would be unwise to assume that this is always the case. So far as we know, no instance has been reported in which the avian tubercle bacillus has been proved to have been responsible for naturally acquired widespread or generalized tuberculosis in a bovine animal. However, we are of the opinion that this phase of the problem has not been adequately investigated to warrant definite conclusions.

Apropos of the question of whether or not the avian tubercle bacillus may give rise to generalized tuberculosis in cattle is the recent report of Timoney. As mentioned previously, Timoney observed a case of tuberculous mastitis from which avian tubercle bacilli were eventually recovered.
This case is of sufficient interest to justify a brief résumé of the findings. The animal was a seven-year-old cow that had been for five years on a farm in the north of Ireland. Eighty to 100 fowls were maintained on the premises and some had died of a "wasting disease" but the cause of death was not investigated. Clinically, it was noted that the cow had a cough and induration of each of the four quarters of the udder. Tuberculosis was suspected. A composite sample of milk was examined microscopically and acid-fast bacteria were found. At necropsy caseous lesions of tuberculosis were found in one small focus in the lung, the lymph nodes and udder. "Grape-like" lesions occurred on the pleura, peritoneum and surface of the liver and spleen. Unfortunately, the only material from this unusual case that was made available for subsequent studies to determine the type or types of tubercle bacilli present was the milk. The milk failed to produce the picture of infection with bovine tubercle bacilli in the guinea-pig. There were produced instead localized, non-progressive lesions of the lymph nodes contiguous to the site of inoculation. From these lesions acid-fast bacilli with the cultural and pathogenic characters of avian tubercle bacilli were obtained.

It is regrettable that in this case material from other situations was not made available for study since it would have been most interesting to know if the lesions in the thoracic and abdominal cavities were due to the same type of tubercle bacillus that was apparently responsible for the changes in the udder.

Plum of Copenhagen stated that the pregnant uterus of cows appears to be the site of predilection for avian tubercle bacilli and that, when these bacteria invade the uterus, they are capable of producing abortion. Plum has investigated this problem rather extensively and has succeeded in isolating avian tubercle bacilli from a considerable number of cases. In 1938 Plum reported that in Denmark approximately 1 per cent of the abortion in cattle is due to tuberculosis but that the incidence is decreasing owing to the eradication of bovine tuberculosis. He maintained, however,
that an increasing percentage of tuberculous abortions is due to the avian tubercle bacillus. It is of interest to note that Plum failed to induce abortion in cattle by feeding avian tubercle bacilli but that abortion did occur in three of four pregnant cows when the bacteria were given intravenously and that in the animals that aborted the infection was limited to the uterus. Plum's observations are of much interest as they incriminate the avian tubercle bacillus in a somewhat anomalous role. At the present time there is no evidence that the avian tubercle bacillus is a factor in causing abortions in cattle in the United States.

Material for a satisfactory study of the histologic picture of the lesions of avian tuberculosis infections in cattle is not available and for obvious reasons is difficult to obtain. However, through the kindness of others we have been able to supplement our own material and while the material at hand represents but six cases the character of the tissue reaction is of sufficient interest to warrant a brief description.* All of the material had been fixed in formalin. Sections were stained with hematoxylin and eosin and additional sections from each specimen were stained to reveal acid-fast bacilli by a carbolfuchsin combination described elsewhere. The tissues available for histologic examination consisted of the bronchial lymph node, one case; mesenteric lymph node, two cases; retropharyngeal lymph node, two cases, and the uterus, one case. All were from cattle that had been naturally infected with avian tubercle bacilli and contiguous portions of the material prepared for histologic study had yielded avian tubercle bacilli.

Lymph nodes.—The microscopic picture of the affected tissues varied with the degree of severity of the involvement. In some instances the lesions were confined to a few or to several lobules and there was a tendency for the older or caseous lesions to become encapsulated (fig. 1). In other instances where the disease was rather generally distributed

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*Our own material was supplemented by tissues kindly supplied by Dr. N. Plum of Copenhagen and Dr. G. T. Creech, United States Bureau of Animal Industry, Washington, D. C.
throughout the node, the changes were of a more diffuse, productive character with no peripheral delineation and with necrosis and calcification minimal in amount (fig. 2). The cells concerned in the reactive processes were those characteristically associated with tuberculogenic processes in general. Mononuclear or histiocytic forms predominated especially in the productive type of reaction with epithelioid cells easily recognizable especially in regions where tubercle formations occurred and the tubercles had not entirely succumbed to necrobiotic changes. The abundance of lymphoid cells naturally present in the involved lymph nodes made it difficult to ascertain what part if any these cells contributed to the morbid changes. Giant cells of the Langhans type were present in all of the lesions and were fairly numerous in some.

The widespread diffuse involvement noted in the mesenteric lymph node from one case was suggestive of a hematoegenous type of infection. In this instance necrosis was minimal in amount and the similarity of the changes in
widely separated regions of the node indicated a process that had resulted from the same episode of infection (fig. 3).

The lesions that were extensively caseated also showed calcification of varying degrees. These lesions frequently were without any cellular evidence of tuberculogenic activity and were apparently well on the way to healing or at least had reached a state of quiescence. These features were in marked contrast to the productive type of lesions where the morbid process was definitely advancing and where there were few if any signs of successful inhibition.

In only two of the cases were acid-fast bacilli demonstrated microscopically. The bacteria occurred in regions of caseation necrosis and the bacteria were few in number.

Uterus.—It is regrettable that there was available for microscopic examination only one block of tissue from an infected uterus. In the material examined the lesions were confined to the mucous layer and extended through the stroma of this structure to the underlying muscularis. The
lesions consisted of discrete nodules rather characteristic of the so-called hard tubercle (figs. 4 and 5). The cells were predominantly epithelioid with many mononuclear or histiocytic forms in the peripheral zone. A moderate number of lymphocytes also occurred in this region. There was no necrosis and relatively few giant cells of the Langhans type were present. A suggestive tendency toward encapsulation was detectable although this was by no means a prominent feature. Acid-fast bacilli were not seen in any of the tubercles.

The microscopic picture of the lesions in the lymph nodes and uterus was sufficiently characteristic to be acceptable as presumptive evidence of tuberculous infection. However, we were unable to detect features that would definitely distinguish the lesions as specifically those of infection due to the avian tubercle bacillus. It is true that lesions produced by bovine tubercle bacilli are usually more severe than those resulting from infection with avian tubercle bacilli. The
process is more destructive and fewer signs of restraint are apparent. These are differences in degree and can not be depended on to differentiate in cattle the bovine from the avian type of infection.

Conclusions

In this imperfect presentation of certain facts concerning the ability of avian tubercle bacilli to infect cattle it is important to keep in mind that no one can speak with finality on this subject. As mentioned previously, much that is important is yet obscure and a great deal of additional work will be necessary before certain phases of the problem are satisfactorily elicited. Conclusions must be drawn with caution and certain facts, although apparently established, should be accepted with reservations. Within these limitations we believe that the significant information available may be summed up as follows:

1. Avian tubercle bacilli have at least a limited pathogenicity for cattle.

2. The morbid changes produced are inclined to remain localized. Whether or not avian tubercle bacilli are ever responsible for a destructive, widespread or generalized tuberculosis in cattle is not known.

3. The histologic picture of the lesions is characteristic of changes ordinarily recognized as tuberculosis. Microscopically the lesions, while usually less severe than those produced by the bovine tubercle bacillus, are without features that would serve to identify them as having been produced specifically by avian tubercle bacilli.

4. The avian tubercle bacillus is apparently capable of a parasitic existence in the tissues of cattle without necessarily giving rise to recognizable tissue changes.

5. Following natural exposure to avian tubercle bacilli, cattle may become sensitized to avian tuberculin and some of the animals may react to mammalian tuberculin also.

6. The interpretation of the tuberculin test in cattle is made more difficult and uncertain by the existence of tuberculosis in poultry. A definite and positive program for the elimination of tuberculosis in fowls should constitute the next phase of our attack on tuberculosis in animals.
REFERENCES


6. Plum, N.: Quoted by Feldman, W. H.


14. Wight, A. E.: Personal communication to the authors.

LEGENDS

Fig. 1. Lesion of naturally acquired avian tuberculosis infection, bronchial lymph node of a cow. The cells are predominantly epi-
thelioid and histiocytic in character. Giant cells are numerous. Necrosis is minimal in amount (x 110).

Fig. 2. Lesion of naturally acquired avian tuberculosis infection, mesenteric lymph node of a calf. The reaction is largely of the productive variety and consists mostly of epithelioid cells with little if any necrobiotic changes. (Photomicrograph of material kindly supplied by Dr. G. T. Creech, United States Bureau of Animal Industry, x 110.)

Fig. 3. Numerous small epithelioid tubercles indicative of multicentric origin of infection. Same case as figure 2 (x 170).

Fig. 4. Naturally acquired avian tuberculosis infection of the uterus of a cow. Discrete tuberculous nodules in the stroma of the mucosa. (Tissue received through the courtesy of Dr. N. Plum, Copenhagen, x 60.)

Fig. 5. Discrete epithelioid tubercle in lower portion of the mucous membrane of the uterus of a cow. Same case as figure 4 (x 150).

TABLE 1

Partial Summary of Instances in Which Avian Tubercle Bacilli Were Demonstrated From Material of Naturally Affected Bovine Animals

<table>
<thead>
<tr>
<th>Reported by*</th>
<th>Year</th>
<th>Number of Cases</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kruse</td>
<td>1893</td>
<td>1</td>
<td>Confirmed by Pansini.</td>
</tr>
<tr>
<td>Pansini</td>
<td>1894</td>
<td>1</td>
<td>Not conclusive.</td>
</tr>
<tr>
<td>Johne and</td>
<td>1895</td>
<td>1</td>
<td>Lesions atypical for bovine type of infection.</td>
</tr>
<tr>
<td>Frothington</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bang</td>
<td>1908</td>
<td>1</td>
<td>Organism isolated from bronchial lymph node.</td>
</tr>
<tr>
<td>De Jong</td>
<td>1910</td>
<td>1</td>
<td>Organism obtained from lung of calf.</td>
</tr>
<tr>
<td>Griffith</td>
<td>1928</td>
<td>1</td>
<td>Organism from a caseocalcareous lesion in mesenteric lymph node of a calf.</td>
</tr>
<tr>
<td>Van Es and</td>
<td>1930</td>
<td>11†</td>
<td>Material from 164 animals was studied. Lymph node material was examined in most instances.</td>
</tr>
<tr>
<td>Martin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Univ. of Illinois</td>
<td>1930</td>
<td>5‡</td>
<td>Organisms obtained from localized lesions of lymph nodes.</td>
</tr>
<tr>
<td>Hastings, Wis-</td>
<td>1933</td>
<td>1</td>
<td>Organism obtained from lymph node tissues of nonvisible lesion reactor.</td>
</tr>
<tr>
<td>nicky, Beach</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and McCarter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feldman and</td>
<td>1935</td>
<td>3</td>
<td>Material from eleven animals that had reacted to tuberculin was studied.</td>
</tr>
<tr>
<td>Schlotthauer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crawford</td>
<td>1936</td>
<td>1</td>
<td>Organism obtained from one of seven cattle from the Island of Guernsey.</td>
</tr>
</tbody>
</table>
### REACCREDITATION OF MODIFIED ACCREDITED COS. 133

<table>
<thead>
<tr>
<th>Reported by</th>
<th>Year</th>
<th>Number of Cases</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>McCarter, Hastings and Beach Minett</td>
<td>1937</td>
<td>3</td>
<td>Twenty-eight cattle that had reacted to tuberculin were studied.</td>
</tr>
<tr>
<td>Glover and Griffith Plums</td>
<td>1935</td>
<td>3</td>
<td>Lesions nonprogressive and calcareous.</td>
</tr>
<tr>
<td></td>
<td>1937</td>
<td>57</td>
<td>Lesions mostly in mesenteric lymph nodes.</td>
</tr>
<tr>
<td>Kelland, Frood and Doyle</td>
<td>1938</td>
<td>3</td>
<td>Opportunity for exposure to avian tubercle bacilli existed on premises.</td>
</tr>
<tr>
<td>Timoney</td>
<td>1939</td>
<td>1</td>
<td>First instance of tuberculous mastitis recognized clinically due to avian tubercle bacillus.</td>
</tr>
<tr>
<td>Remmel</td>
<td>1938</td>
<td>1</td>
<td>Organism obtained from broncho-tracheal mucus. No evidence of pulmonary lesions.</td>
</tr>
<tr>
<td>Feldman and Karlson</td>
<td>1939</td>
<td>3</td>
<td>Material from 36 animals that had reacted to mammalian tuberculin was studied.</td>
</tr>
</tbody>
</table>

*Bibliographic data pertaining to the respective authors reporting prior to 1938 will be found in chapter 10 of the monograph by Feldman.*

†There were four additional cases in which both avian and mammalian tubercle bacilli were present.

‡The report stated that the avian tubercle bacillus was obtained in approximately 10 per cent of the fifty calves examined.

§Plum has also obtained avian tubercle bacilli from several additional cases of tuberculous abortion in cattle.

**PRESIDENT AXBY:** We will now pass on to the next item on the program which is entitled, "Reaccreditation of Modified Accredited Counties in New York," by Dr. E. T. Faulder, director of the Animal Husbandry Bureau, Department of Agriculture and Markets, State of New York, Albany, New York. (Applause.)

### REACCREDITATION OF MODIFIED ACCREDITED COUNTIES IN THE STATE OF NEW YORK

*By Dr. E. T. Faulder, Director, Bureau of Animal Industry, New York State Department Agriculture and Markets.*

The tuberculin testing of cattle in New York State under the Accredited Herd Plan began in May, 1918. From the beginning of this project, emphasis has been placed on the importance of retesting accredited herds and of maintaining all counties as modified accredited.
During the years prior to 1930, an attempt was made to retest accredited herds at owners' expense. It was found by experience that a considerable number of owners of purebred cattle, dairymen who were required to have annual tests in order to sell milk, and others interested in having their herds listed as "accredited", would readily compensate an accredited veterinarian for conducting the test. However, it was also found that there was a considerable number of dairymen and cattle owners who were satisfied that their herds had been accredited but would not consent to have the herds retested at their expense.

In 1930, the New York State Legislature made its first appropriation of $400,000 to compensate accredited veterinarians for retesting accredited herds. This plan has proved successful, and it is only on rare occasions that a dairymen is not ready to have his cattle tested when notified by the accredited veterinarian. Annual appropriations for the retesting of accredited herds have been made by the New York State Legislature, the amount being increased to $40,000 in 1936. In 1935 and 1936, however, an additional $50,000 was expended each year on the work of retesting accredited herds.

The retesting of accredited herds in New York State is done by a group of approximately 400 veterinarians who are accredited by both the United States Bureau of Animal Industry and the State of New York. These veterinarians are assigned to zones made up of one or more townships, the assignment of territory being agreed upon by the accredited veterinarians in each county. Each veterinarian is provided with a blanket authorization covering the accredited herds in the townships assigned to him. County tuberculosis records are maintained in the county and each accredited veterinarian has a complete list of all the accredited herd owners in his territory. In cases where a herd is dispersed, the veterinarian is required to make a report in duplicate—one copy being sent to the Albany office and the other to the county office where the tuberculosis records are maintained. Under this plan, the county tuberculosis records, the records
in the State Bureau of Animal Industry and in the office of the Federal Bureau of Animal Industry are kept up to date.

The veterinarians are compensated at the rate of $2.50 for each herd tested, plus 20c for each animal in the herd, making an average cost of 32c for testing each animal. This plan has proved successful, since veterinarians are compensated equally for the testing of small groups of cattle as for testing large groups.

The results of the retesting of accredited herds by years are as follows:

<table>
<thead>
<tr>
<th>Calendar Years</th>
<th>Herds Retested</th>
<th>Cattle Retested</th>
<th>Reactors</th>
<th>Per Cent</th>
<th>Herds Infected</th>
<th>Per Cent of Herds Infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930 (Mar. to Dec. 31)</td>
<td>53,366</td>
<td>616,404</td>
<td>4,069</td>
<td>.66</td>
<td>1,897</td>
<td>3.5</td>
</tr>
<tr>
<td>1931</td>
<td>69,591</td>
<td>802,578</td>
<td>4,561</td>
<td>.57</td>
<td>2,163</td>
<td>3.14</td>
</tr>
<tr>
<td>1932</td>
<td>80,100</td>
<td>930,734</td>
<td>4,151</td>
<td>.45</td>
<td>2,051</td>
<td>2.56</td>
</tr>
<tr>
<td>1933</td>
<td>73,613</td>
<td>882,388</td>
<td>3,656</td>
<td>.41</td>
<td>1,865</td>
<td>2.53</td>
</tr>
<tr>
<td>1934</td>
<td>87,295</td>
<td>1,058,690</td>
<td>4,610</td>
<td>.44</td>
<td>2,319</td>
<td>2.67</td>
</tr>
<tr>
<td>1935</td>
<td>88,404</td>
<td>1,020,855</td>
<td>3,134</td>
<td>.31</td>
<td>1,687</td>
<td>1.85</td>
</tr>
<tr>
<td>1936</td>
<td>93,381</td>
<td>1,156,878</td>
<td>2,147</td>
<td>.19</td>
<td>1,164</td>
<td>1.25</td>
</tr>
<tr>
<td>1937</td>
<td>94,978</td>
<td>1,354,542</td>
<td>2,975</td>
<td>.22</td>
<td>1,371</td>
<td>1.39</td>
</tr>
<tr>
<td>1938</td>
<td>75,840</td>
<td>1,218,836</td>
<td>3,206</td>
<td>.26</td>
<td>1,497</td>
<td>1.97</td>
</tr>
</tbody>
</table>

Systematic retesting of accredited herds has materially reduced the number of reactors found each year, as well as the percentage of herds revealing infection. Whenever infection is found in an accredited herd, the herd is retested at regular intervals by regularly employed state, Federal or county veterinarians until eligible again to be listed as "accredited."

In the tuberculin testing of cattle, all veterinarians are first required to make a survey of the herd, recording the tag numbers of the old animals, of animals which have passed negative tests in herds where infection has existed, and of animals acquired from sources in which infection has existed. All tests are made by the double intradermic method and the veterinarians are required to have the animals properly restrained, permitting the injections to be made in a careful and accurate manner. In the reading of the test, animals which may exhibit slight or suspicious reactions, and at times older animals which have passed
several negative tests, are subjected to further tests by the short subcutaneous method. When this careful method of testing is carried out there is little likelihood of a tuberculous animal remaining in a herd.

The number of accredited herds in New York has increased from year to year so rapidly that sufficient funds are not available to provide for an annual tuberculin retest on all accredited herds in the state, which number 139,129 and which comprise 1,838,156 cattle.

The plan to take care of the retesting of accredited herds during the year 1939, and which will be modified slightly from year to year, calls for the retesting of all accredited cattle in a group of 14 intensive dairy counties in the central part of the State where initial infection ranged from 38 to 53 per cent, omitting small herds made up of one to eight animals where no infection has ever existed. These small herds will be retested on a three-year basis.

In the remaining counties, the retesting of accredited herds will be done on a two-year basis, approximately one-half of the cattle being retested each year, particular attention being paid to accredited herds which have shown infection at any time.

During the years 1930 to 1939 inclusive, the New York State Legislature has appropriated a total of $4,300,000 to compensate accredited veterinarians for the retesting of accredited herds. During the calendar year 1939, the appropriation of $450,000 will provide for the retesting of approximately 80,000 accredited herds, representing 1,383,000 cattle. This is looked upon as insurance. From 1918 to the present year the New York Legislature has appropriated a total of $47,000,000 for tuberculosis indemnities, in addition to which the Federal Bureau of Animal Industry has expended approximately $11,000,000 in New York State in the form of federal indemnities. These appropriations do not include operating expenses.

During the years 1921 to 1939, approximately 50 County Boards of Supervisors have appropriated $3,000,000 for the
employment of County Veterinarians, Assistant County Veterinarians and office help.

It will continue to be the policy in New York State to protect these huge investments by the systematic and periodic retesting of accredited herds, and by maintaining all counties as modified accredited. To neglect to the slightest degree this important work is similar to building a house and failing to have the investment covered by fire insurance, or the failure of a man to carry life insurance for the protection of his dependants.

PRESIDENT AXBY: We, who are all chief sanitary officials interested in getting the ideas and actions and policies of states that have comparable work, are very appreciative for this report, Dr. Faulder.

The next item is: "The Principles of Disease Control," by Dr. D. M. Campbell, editor of "Veterinary Medicine," Chicago, Illinois. Dr. Campbell. (Applause.)

FUNDAMENTALS OF ANIMAL DISEASE CONTROL

By D. M. Campbell,

Editor, "Veterinary Medicine," Chicago, Illinois.

The live stock sanitary setup in most of the states was organized in the last decade of the 19th century or the first decade of the present century, i.e., 30 to 50 years ago. New information on the importance of certain animal diseases to the public health, changes in animal production and in the distribution and relative importance of different diseases, in methods of transporting animals, in the availability of competent veterinarians and the developments of research amply justify a re-examination of the live stock sanitary services of the states, with a view to better adapting them to present conditions and to making such improvements in them as experience has shown to be desirable.

The United States Live Stock Sanitary Association is the logical organization to initiate and promote improvement of the animal disease control service in the various states. It is
unofficial and thus possesses complete freedom of action. It is interested in the animal disease situation in each of the states. It is a scientific organization, obligated to serve only the best interests of the live stock industry of the whole country, and its membership possess the largest pool of information and experience in the control of animal disease to be found anywhere in the nation.

Animal disease, wherever located, is an interstate or national problem. It is unnecessary for example to tell a veterinarian in Iowa or Nebraska that the handling of anthrax in South Dakota concerns him or a veterinarian in New York that the control of Bang’s disease in Missouri concerns him. The efficiency of the live stock sanitary service of each state is to a greater or less degree, a concern of the service in every other state. Even if the interest of this Association in the general welfare of animal industry in the whole country did not impel it to concern itself with disease control throughout the land, the ease with which animal disease may be transported from one part of the country to another and the certainty of its being so disseminated in the enormous interchange of animals for breeding, feeding, show or other purposes, give each state a particular interest in every other.

I think there can be no disagreement with the statement that an efficient state setup for live stock sanitary control should include the delegation by the state government of sufficient authority to carry out the work and adequate financial support, a trained personnel, an adequate system of communication for the location of outbreaks of disease and sufficient veterinary vital statistics to supply the information necessary to planning the work.

There are many and obvious advantages to vesting state live stock sanitary control in a commission of five members, three of whom shall be actively and principally engaged in live stock production and two of them should be veterinarians, principally and actively engaged in the general practice of veterinary medicine. The advantages of such a commission
so outweighs the disadvantages that, in correspondence with most of the state veterinarians, not any raised a serious objection to this plan and many enthusiastically favored it.

A commission, the majority of whom are live stock producers, will give the live stock industry of the state a confidence in the commission that would be difficult to attain otherwise, and a support that would increase their prestige with state legislatures and governors beyond that likely to be attained by a strictly professional board. Furthermore, they would bring an experience and a wisdom of paramount value to the board in the development of regulations for live stock disease control. If appointed for a term of five years and removable only for cause, with their terms of office expiring consecutively so that but one inexperienced member will be on the board at any given time, most of the pernicious influences of politics would be avoided, since in the usual course of events, no single state administration would appoint all of the board. Further, if such a commission included members from various branches of the live stock industry, as for example dairying, swine raising and poultry husbandry, its advantages would be enhanced.

Since the commission would deal largely with professional matters, the necessity for the inclusion of veterinary members seems inescapable and the advantage of having general practitioners, for the confidence they would inspire among live stock producers, with some of whom and perhaps with many of whom they would be acquainted, seems obvious.

The Live Stock Commission should be responsible to the governor who is the head of the state government and official representative of the people of the state. It is admitted that since such a board would be responsible for the health of the live stock of the state, they would be in some measure, responsible for the wholesomeness of the food consumed by the general public and for this reason a representative of the medical profession or of the general public or both, might well be included in the personnel. However, since the duties of such a commission would be largely technical and it
would have every incentive to work in complete cooperation with the state department of health, it is believed that the advantages of having a small commission of five members outweighs those of giving the medical profession and the general consuming public representation on it.

Since the commission's functions should be largely the professional ones of animal disease control, that they must be carried out through the veterinary service of the state seems inescapable.

There is general agreement that the commission should employ a chief or state veterinarian and that he should be the executive secretary and chief executive officer of the commission. That his status should be a civil service one seems obvious. The association of political preferment and ability in live stock disease control are not assured and, furthermore, the security of tenure contemplated under civil service is conducive to independent and efficient action and, even more, the accumulation of knowledge and experience invaluable in work of a nature so highly technical.

The state veterinarian should be free to perform his duties in accordance with the laws of the state and the regulations of the live stock commission, without political pressure or fear of removal for anything except failure in professional duties. Furthermore, selection under civil service procedure would give the live stock commission a wider field—the whole country—from which to select its executive officer, instead of the citizens of the state, from whom it would be expected that a more or less political appointment would be made.

The remainder of the live stock disease control organization it is thought should be, at a minimum, about as follows:

A state diagnostic laboratory under the supervision of the state veterinarian, the services of which are available without charge to all licensed veterinarians in the state. The head of the laboratory should act, in addition, as disease statistician for the service. His position, of course, to be a civil service one.
One or more whole-time assistant state veterinarians holding their positions under state civil service and responsible to the state veterinarian.

The state veterinary service in the field to be carried out by local veterinary practitioners under the direction and supervision of the state veterinarian and assistant state veterinarians, and paid for by the state; it being the policy to employ every qualified man in the state desirous of such employment for service in disease control, disease investigation and the carrying out of live stock regulatory matters in the community in which the local veterinarian practices.

The desirability, in fact the necessity of a state live stock sanitary service employing every veterinary practitioner in the state can be fully supported. In the first place, it is far less expensive to the taxpayers than whole-time employes for the same duties. The practitioner is located in the areas where disease occurs. He is all the time on the watch for outbreaks of disease and at no expense to the state, and when his services are required, they are immediately available at no expense to the state for travel or hotel bills. In carrying out quarantine laws or enforcing the regulations governing interstate shipment and in quarantining animals that come into the state in violation of the regulations for imported animals, each practitioner is as valuable, perhaps more valuable to the state than a whole-time employee in his location and would cost the state very little for this work—nothing, except when he was called upon to act for the state. But probably the greatest single advantage of including the practitioners of the state in the official live stock sanitary service would be the information supplied in weekly reports to the state veterinarian concerning the health of animals in the locality of each. There is little available in veterinary literature on epizootiology and even the best informed in the profession know little of it, because it is a science that has not been developed in this country. This situation is in marked contrast to that in public health work where a knowledge of epidemiology is regarded as a pre-
requisite for the public health official and indispensable to an efficient public health administration.

Epizootiology is a sort of mass pathology. One would not want to entrust the care of his animal, suffering from a serious infection, to a veterinarian who was not informed as to how the infection gets into the animal's body, how the body resists the infective organisms and how these organisms leave the body. It is equally important to know how disease enters a county or a state, how it spreads after it gets there, what finally becomes of it and how likely it is to return. These matters can be learned only by keeping better veterinary vital statistics in the future than we have kept in the past.

Furthermore, in the matter of locating disease, we certainly cannot be taken very serious in our desire for the control of animal disease until we take measures to find out where the disease is located. The fire department that didn't establish a signal system for locating fires would not be taken very seriously. The practitioners, distributed as they are over every portion of the state, are the local signal stations for animal disease. Infectious disease of animals is, in a good many respects, like a fire. There is a time when it is easily suppressed; later it may be far more difficult. It is also somewhat like fires in that records of what has occurred in the past are indicative of what may be expected in the future. They enable a service to plan for contingencies that are quite apt to develop.

Perhaps it should be repeated that the foregoing would constitute a minimum organization. In states in which the animal industry is large and veterinary practitioners numerous, more whole-time assistant state veterinarians would be required and possibly some whole-time county veterinarians, and certainly a statistician as a separate official, possibly responsible directly to the live stock commission. Such an officer is deemed indispensable to a public health department.

Personal correspondence with live stock sanitary officials
in the several states reveals that many of them, perhaps a majority of them, believe a definite statement by this Association on what it considers the best type of live stock sanitary organization for a state would be of material assistance to those endeavoring to bring about improvements in the organizations, laws and regulations for the protection of animal husbandry in various states. It is the plain duty of this organization to the live stock industry to support and assist in every feasible way those endeavoring to improve the control of the diseases of live stock in any part of the country. It cannot render a greater service to that cause at this time than by outlining definitely those things essential and desirable in animal disease control.

PRESIDENT AXBY: We thank you, Dr. Campbell. There is a lot of food for thought in that paper, and fully in line with the complexities of the civilization that confronts us, which gets continually more complex. I am sure every chief sanitary officer, and every man interested in live stock and sanitation, who wants to keep in the vanguard, will welcome an opportunity to read and digest this paper.

The Chair now recognizes Dr. Koen, who will make his report for the Committee on Meat and Milk Hygiene.

Dr. Koen.

REPORT OF COMMITTEE ON MEAT AND MILK HYGIENE

DR. A. F. SChALK, Chairman, Columbus, Ohio

DR. J. S. KOEN, Storm Lake, Iowa
DR. C. H. CLARK, Lansing, Michigan
DR. H. B. LEONARD, Albany, New York
HON. J. B. McLAUGHLIN, Charleston, West Virginia

The Committee on Meat and Milk Hygiene is glad to report much progress in meat inspection service by states and municipalities supplementing the service of the United States Bureau of Animal Industry.

The program of today was developed to bring to your attention the splendid progress made during the year.

San Antonio, Texas, has been the latest city of major importance to advance municipal meat inspection to a professional service by
supplanting lay inspectors with veterinarians under the supervision of Dr. A. E. Wharton.

Dr. George E. Corwin has reported the progress made in Connecticut under their state meat inspection system. The advancement made in Connecticut presages progress in the New England states.

Pennsylvania has also improved their state meat inspection by the employment of competent veterinary inspectors.

Montana has inaugurated an improved system of state meat inspection during the last few months. Dr. G. A. Kay, former inspector in charge of federal meat inspection at Cedar Rapids, Iowa, upon retirement from the Bureau last October, was employed by Montana to supervise this enlarged state service.

Dr. Harkness has told of the Kellogg Foundation in Michigan, and how it has furthered local meat inspection in small cities and towns and in rural communities by employment of the local practicing veterinarians for part time service.

Mr. I. W. Ringer, Seattle, Washington, has given you a comprehensive report on the advancement of local meat inspection service in the far Northwest.

Thus in the extreme South, Northeast and Northwest we are glad to report progress.

The report of the Special Committee on Poultry and Rabbit Meat Inspection will be presented on Friday afternoon. It outlines a detailed study of that phase of meat inspection and deserves your serious consideration.

The Resolution Committee will present some matters relating to meat inspection for your consideration. Your committee indulges the hope you may take favorable action thereon.

PRESIDENT AXBY: Thank you Dr. Koen.

The next paper is titled, "Equine Encephalomyelitis in 1939," by Dr. H. W. Schoening, Dr. L. T. Giltner, and Dr. M. S. Shahan, Bureau of Animal Industry, United States Department of Agriculture, Washington, District of Columbia. I understand that Dr. Shoening is to deliver this. Dr. Shoening. (Applause.)

DR. H. W. SCHOEING: Mr. Chairman and Gentleman: I would like to take this occasion to express the Bureau's appreciation to the reporters in the various states who have contributed to the collection of the statistics on encephalomyelitis. We are very much encouraged by the increased efficiency in these reports.
Continuing the program begun in 1935, the Bureau has collected and compiled data on the incidence, mortality, and other aspects of infectious equine encephalomyelitis this year. During the 5 years considerable variation in intensity of the disease has been experienced. In 1935, 23,512 cases were reported; in 1936, there were only 3,929; in 1937, and 1938, there were 173,889 and 184,662, respectively. In 1939, a distinct drop in incidence occurred. To date, 7,988 cases have been reported from 42 states, the six states reporting no disease being Mississippi, New Hampshire, Pennsylvania, South Carolina, Tennessee, and West Virginia.

The rate of incidence for the entire country in 1939 is calculated from present figures to be 1.12 cases per 1,000 animals; the general mortality as 30.3 per cent of affected animals. Although far from complete, the reports show a considerable difference in mortality among animals under 1 year of age (20.98 per cent in horses and 31.35 per cent in mules) when compared with animals over 1 year of age (36.02 per cent in horses and 76.04 per cent in mules). The relatively high mortality in mules can be accounted for by the fact that most of these were reported from areas where eastern-type virus prevails or is suspected. As in previous years, the bulk of the cases, 7,136, were reported from 28 states west of the Appalachian Mountains, less than 600 being reported from Eastern states. The rate of incidence in the former area was 1.07 cases per 1,000 and for the latter, 2.32 per 1,000. The mortality in the West was 26.7 per cent and 85.6 per cent in the East.
Seasonal Incidence of the Disease

In 1939, information concerning the approximate dates of the first and last cases was furnished by the reporters. Twenty-three states reported the first cases as occurring after the first of May and the majority reported the last cases in September and October. While no attempt was made to determine the peak period on a general basis, most states reported the greatest incidence during July, August, or September. However, 12 states, all of which experience killing frosts, reported cases in January through April. On the whole, such cases are rather limited in number, but frequent enough to invite some question as to their being included as true cases of the virus disease.

A case of infectious encephalomyelitis positively diagnosed in January 1939 in Florida can readily be conceded as having been contracted in the usually accepted manner,—that is, by mosquito transmission. But cases diagnosed as infectious encephalomyelitis in Northern States during the cold months are more difficult to understand, in the light of our present knowledge. It is clearly apparent, judging from pathological and biological evidence, that at least some such cases are due to causes other than the specific virus of equine encephalomyelitis. Among such causes, moldy corn and other toxic feeds are to be considered, and at the same time it must be accepted that cases of moldy corn poisoning, or leucoencephalomalacia, may occur during the commonly prevalent encephalomyelitis epizootic season. It should be recognized that certain mineral poisons, the apparent toxemia of so-called secondary or “X” disease, of which 131 cases in 8 states were reported in 1939, or other causes, are to be as much or more suspected than encephalomyelitis virus in atypical cases or in sporadic cases occurring during seasons not compatible with the commonly accepted ideas as to methods of transmission.

While it is recognized that it is a practical, if not a physical, impossibility to determine the exact cause of every case of apparent brain involvement in horses throughout the year,
it appears that we shall be compelled to be more discriminat-
ing in our classification of such cases, if we are to attain any
high degree of accuracy in compiling data on the prevalence
of the several types of nervous diseases. Undoubtedly, care-
ful clinical study will suffice for the classification of many
cases, but many others will require closer attention if any
considerable progress in definition is to be made.

An exact determination of etiology in indefinitely classified
cases can usually be made by laboratory examinations. The
search for virus is facilitated by selection of cases and careful
handling of specimen tissues, but it should be recognized
that all clinical cases of infectious encephalomyelitis do not
yield virus, even under the best of conditions. While the
demonstration of virus definitely classifies a given case as
infectious encephalomyelitis, failure to recover virus cannot
be accepted as conclusive proof that the case is not one of
virus encephalomyelitis. In our experience, the histopath-
ology of the specific virus disease appears to be quite char-
acteristic, being definitely different from that of moldy corn
poisoning and the so-called secondary disease.

**Studies of Types and Strains of Virus**

Both eastern- and western-type virus has been identified
in Alabama this year. In addition, apparent cases of toxic
encephalitis have been identified during the same period.
Viruses from other cases elsewhere in the country thus far
have agreed with anticipations based on previous experiences
as to virus type. It may be mentioned, however, that two
strains of virus submitted to the Bureau by Dr. F. W.
Schofield of Ontario, Canada, gave every indication in our
hands of being of eastern type.

As a result of examination of specimens from field cases,
16 strains of virus were recovered and typed during the year
in the Bureau's laboratories. All except two western strains
from Alabama, mentioned above, and one western strain
from Texas, were of eastern type, as their origin had sug-
gested.
Doctors Biester and Schwarte of the Veterinary Research Institute at Ames, Iowa, cooperated with the Bureau in the study of field cases in Iowa in 1939. They recovered 8 strains of virus, which were all found to be of western type.

The commercial vaccines used in the field in 1939 were found to immunize guinea pigs against all 26 strains (Alabama—7 strains, Florida—1 strain, Georgia—1 strain, Massachusetts—2 strains, Maryland—4 strains, Texas—1 strain, Iowa—8 strains, Ontario—2 strains) of virus examined during the year, immunologic types considered.

Production and Use of Vaccine

The reports received this year show a total of 805,247 horses and mules vaccinated with formolized chick-embryo vaccine in areas where infectious encephalomyelitis appeared. Of these, 289 are reported to have developed encephalomyelitis. The reported incidence in vaccinated animals was 0.36 cases per 1,000, as contrasted with 1.3 cases per 1,000 in unvaccinated animals in the same states.

The Division of Virus-Serum Control reports 9,462,305 10-cc doses produced in 1939. Of these, it may be fairly estimated from all the information at hand that about 6,000,000 doses (3,000,000 2-dose vaccinations) were administered. These figures are almost 4 times greater than the number actually reported to the Bureau. Most of the states reporting indicate that their figures are incomplete and it is probable that the estimate given above more nearly represents the actual number of horses and mules vaccinated.

Twelve states reported 84,044 animals vaccinated in 1939 which had been vaccinated in 1938. The incidence among these animals is calculated to be 0.37 case per 1,000, a figure comparable with the incidence in all vaccinated animals. In view of the incompleteness of these data, a strict interpretation of the figures is not justified. However, the incidence in vaccinated animals is materially less than in non-vaccinated and is in general accord with experimental results.
Vaccination of itself has been reported to have been responsible for the death of some few animals, not from encephalomyelitis, but rather from the procedure per se. Reports from all sources indicate that severe local reactions or untoward systemic reactions were of comparatively minor general importance in encephalomyelitis vaccination. The Army vaccinated over 35,000 animals without any serious reactions. There was not a single loss from encephalomyelitis in these animals. However, in a few instances, the experiences of individual practicing veterinarians were reported as unfavorable. In these cases there were reported gross edema, with or without other symptoms of infection, and abscess formation. Tests conducted by the distributing firms themselves, the Bureau, and other agencies showed that the vaccines used were free of contaminating bacteria.

The preference among practicing veterinarians appears to be toward intramuscular rather than subcutaneous injections, though exceptions were noted. Some reports of swelling and extreme pruritis, developing when the second dose was injected at the site of the first, were received. The reports as a whole indicate that many have not anticipated the slight to moderate swellings to be expected when formolized tissue is injected.

Relatively very few cases of anaphylactic shock, with an occasional death, were reported. Inappetence, dullness, and drowsiness, and even temporary weakness and incoordination, were reported following vaccination in a few cases. Symptoms of acute colic as well as abortion were encountered in a few instances.

Summary

The salient features of the incidence and mortality due to infectious equine encephalomyelitis as reported to date in the United States in 1939 are given. There are reported 7,988 cases, with a general incidence of 1.12 cases per 1,000 animals, and a general mortality of 30.3 per cent of the affected animals.
The classification as to type of 26 viruses studied during the year is given. Two cases in Alabama were found to be due to western-type virus and 5 other cases yielded eastern-type virus. Only eastern-type virus was found in 1 case from Florida, 1 case from Georgia, 4 from Maryland, and 2 from Massachusetts. One Texas case yielded western-type virus, and 8 strains from Iowa were similarly classified, while two strains of virus from Ontario were found to be of eastern type.

Reference is made to the desirability of accurate diagnosis of a typical case or of those occurring during months when infectious encephalomyelitis is not commonly prevalent.

From the reports of vaccination with formalized chick-embryo tissue vaccine, as rendered for 1939, it is estimated that 3,000,000 horses and mules were vaccinated during the year. Among 805,247 actually reported vaccinated, the rate of incidence of infectious encephalomyelitis is reported as 0.36 case per 1,000.

PRESIDENT AXBY: Thank you Dr. Schoening. I am sure that not only we, but the general public is interested in a concise, up-to-date report on encephalomyelitis for the year 1939.

For the first time since opening this annual meeting, the Chair finds an opportunity for discussion. Does anyone have any questions they want to ask on any of the subjects covered this morning? If not, in view of the grave necessity for a meeting of the Executive Committee, and without objections, we will stand adjourned until one-thirty p.m.

THURSDAY AFTERNOON SESSION
DECEMBER 7, 1939

The meeting convened at 2:35 p.m., President Axby presiding.

PRESIDENT AXBY: The Association will please be in order.

PRESIDENT AXBY: The first item on the program this afternoon, under this Rabies Session, is one entitled, "Rabies," by H. W. Schoening, chief, Pathological Division of the Bureau of Animal Industry, U.S. Department of Agriculture, Washington, D.C. This topic will include the report of the Committee on Rabies. I present to you Dr. Schoening. (Applause.)
DR. H. W. SCHOENING: Mr. Chairman, Gentlemen: My discussion this afternoon is going to be devoted entirely to the Report of the Rabies Committee. There was a little bit of a mix-up in the program, and in order to take care of the subject in good shape, our Secretary made it quite inclusive. But, I am going to give the report of the Rabies Committee, only.

REPORT OF THE COMMITTEE ON RABIES

DR. H. W. SCHOENING, Chairman, Washington, District of Columbia

DR. M. F. BARNES, Harrisburg, Pennsylvania
DR. EDWIN T. POWELL, Boise, Idaho
DR. FRANK BREED, Lincoln, Nebraska
DR. H. C. RINEHART, Springfield, Illinois

Live stock sanitary and public health officials have been coping with the rabies problem for years. Discussions in the public press, dog journals, and similar papers in recent years on the use of prophylactic vaccination of dogs against rabies have served to focus public attention on the diseases and have made the dog owner and the public at large acutely conscious that some definite concerted action should be taken to control this disease. Your Committee feels that the time is now ripe to make a critical survey of the rabies situation in the United States and the now-available methods for its control.

In this connection the Bureau of Animal Industry of the U. S. Department of Agriculture has made available to your Committee information obtained from a questionnaire sent by Dr. J. R. Mohler, chief of the Bureau, in May, 1939, to the various state live stock sanitary officials and state health officials concerning methods of control of rabies in their respective states.

The questionnaire concerns itself principally with the authority in the state charged with the control of the disease, the responsibility for its control, the laws and regulations under which the authority acts, the methods of enforcement, the source of funds and whether or not these are adequate, whether vaccination is compulsory in the state and how it is otherwise used, and finally, the number of cases of rabies for the year 1938.

Since this material is somewhat involved and does not readily lend itself for presentation at this time, it will be appended and published as a part of this report. In the discussion to follow, this material will be used.

Through the questionnaire it has been possible to obtain a general idea on the incidence of rabies in the various states in 1938. There
were reported for that year 8,452 cases in dogs; in cattle, 413; in horses, 32; sheep, 164; swine, 42; cats, 207; goats, 11; miscellaneous, 44; and man, 47; making a grand total of 9,412.

A point of importance brought out by the questionnaire is that the authority charged with the control of rabies in a state in many instances is divided between the state live stock sanitary service and the state department of health. Another point of interest and importance is that in most cases funds come from regular appropriations. The laws and regulations governing the control of rabies in most cases appear to be more or less satisfactory and these are based on our knowledge of rabies.

Rabies is a controllable and under certain conditions even eradicable disease. The methods by which these goals are attained are well known. In spite of the knowledge that we possess concerning this disease and the laws on the statute books governing the control of rabies, the fact remains that in many sections little progress is made in controlling the disease. This brings us to the extremely important point that no matter how thorough the regulations are which are promulgated for the control of the disease, the regulations in themselves will be of no avail unless the proper machinery is set up for their enforcement. This, your Committee believes, is the weak link, generally speaking, in the present method of control of rabies in this country.

In most countries where rabies is enzootic, the dog and other carnivora are the principal spreaders of the disease to both man and animals. In certain parts of South America the disease has been spread through the medium of the vampire bat. However, this method of spread appears to be restricted to a few countries at the present time. With the knowledge that we now possess of the disease in this country, the dog can be considered the principal source of the propagation of the disease, and measures for the control of rabies, therefore, should be directed to the control of the disease in dogs.

The recognized measures for the control of rabies in dogs include:

1. The proper disposition of rabid and suspected rabid dogs and the definite diagnosis of the disease in these animals.
2. The destruction of the definitely known bitten dogs and the strict quarantining (or destruction) of contact dogs for at least a 6-months period.
3. Strict licensing of all dogs.
4. The impounding and disposal of stray dogs.
5. Strict general quarantine measures over a sufficiently wide area.
(6) Muzzling of all dogs in certain areas.

(7) To these may be added the use of rabies vaccines.

Not any one of these measures can accomplish the desired end. Leaving aside for the moment item 7, the use of rabies vaccines, all of the measures must be used in combination. Their successful use will depend on how thoroughly they are applied, and it is safe to say that very few, if any, of the states now have the machinery adequate for their application.

The officials in this country charged with the control of live stock diseases have been successful in eradicating one of the most contagious diseases known, namely, foot-and-mouth disease. This disease has appeared in this country on a number of occasions, involving at times considerable territory, but has always been successfully eradicated. The methods used in the eradication of this disease if applied to rabies would result in the control and possibly the eventual eradication of the disease. It is felt that the incidence of the disease at least would be reduced to such a point that it would no longer be an economic or public health problem.

In order to follow out such measures in the control of rabies, it is essential that sufficient machinery and funds be available. It is not the purpose of this Committee at this time to make any recommendations as to what this machinery should be, but it is merely intended to bring out the points necessary to accomplish the desired end. After reviewing the questionnaires from the various states your Committee believes that there is not at the present time in any state where rabies exists to any appreciable extent sufficient funds and machinery to carry out a proper control program.

In line with the principles of the eradication of foot-and-mouth diseases as applied to rabies, it would follow that whenever a case of rabies is diagnosed, action should be taken immediately to get ahead of the disease. This can be accomplished by destruction of the rabid dog and a careful tracing of the movements of this animal. All dogs known to have been bitten by or exposed to this animal should, if at all possible, be destroyed immediately. If it is considered advisable in some cases, animals, which have had contact but in which a definite bite has not been proved, might be placed in absolute quarantine for a period of 6 months where their movements are restricted and where they can be inspected daily. If it is desired, such animals might be given a number of injections of rabies vaccines. In the event that any of these animals develop the disease, there would be no extension of the infection since they are held in rigid isolation. In addition, a rigidly enforced general quarantine of at least 90 days should be placed on a sufficiently wide area to cover local unknown exposures to the rabid dog.
We believe that the foregoing is the most important step in the early control of rabies and that if these measures are followed completely, together with the other measures previously outlined, potential outbreaks of rabies will be stopped and the disease brought under control.

By use of the measures outlined in the preceding paragraphs, England has in recent years (1918 to 1921) completely eradicated rabies (Annual Report of the Chief Veterinary Officer, Ministry of Agriculture and Fisheries, 1919-1921). On page 15 of the Report of the Chief Veterinary Officer for 1921 is a table showing the number of outbreaks of rabies in each of the monthly periods ending on a certain date. This table shows that the disease was eradicated in the various districts in from 1 to 13 months.

The success of the measures as outlined depend on their proper execution. An organization with proper legal authority and sufficient funds to work effectively is absolutely necessary. An organization built around a cooperative project between the federal and state authorities, the enactment of necessary laws and regulations, and the appropriation of sufficient funds for immediate use as they are needed, are tentatively suggested steps looking to the effective control of rabies on a national basis.

Because of its impracticability under conditions in this country, muzzling of dogs is considered of little or questionable value.

The Prophylactic Vaccination of Dogs Against Rabies

In recent years, the prophylactic vaccination of dogs has been introduced as an added weapon to be used in the control of outbreaks of rabies. While the previous outline shows that rabies can be controlled without vaccine, and, under conditions existing in certain countries, completely eradicated, these methods for one or another reason have not been entirely successful in some other countries. The need for an added weapon has resulted in the development of the prophylactic vaccination of dogs. That an effective vaccine would be a valuable agent to be used along with other standard control measures is not questioned.

There has been considerable controversy in this country over the efficacy of the single-injection rabies vaccine. Experimental and field investigations definitely indicate that the present vaccine has value, but like all biological products its limitations should be recognized. The vaccines as prepared today in this country are either phenol- or chloroform-killed and if prepared properly contain no live virus. There is definite evidence to indicate that the resistance of a certain percentage of dogs against rabies can be increased by a
single-injection of vaccine. However, this resistance is only relative, in some animals it may be strong — in others weak, so that some of these animals may be able to withstand considerable exposure to the disease whereas others may not.

Prophylactic vaccination of dogs in communities where outbreaks of rabies exist is predicated on the reduction of the susceptibility of dogs in that area to the disease. If rabies vaccines, for example, are only a certain per cent effective, it could be assumed that, depending on the number of dogs vaccinated, the number of susceptible dogs would be decreased by that per cent. The fewer the susceptible animals, the fewer the number of animals that would become infected and the less chance the disease has for spreading.

Recognizing the fact that the resistance to rabies is variable in vaccinated dogs, it is important to realize the limitations of the vaccine and no false sense of security should prevail because of such vaccination. On the same basis, vaccinated dogs in a rabies-control program should not be given any more consideration than unvaccinated dogs.

It is felt that the potency of present-day rabies vaccines should be increased, and the artificial cultivation of the virus of rabies leads to a hope that this may eventually be accomplished. In the meantime, attention could be given to increasing the number of injections of the present vaccine or increasing the dosage or both, since such measures should raise the effectiveness of vaccination.

The magnitude of a rabies control program in this country is realized by your Committee. Rabies has flourished in many parts of the country for years, and we may be faced with factors and problems which have not been apparent in other countries where the disease has appeared only for a short time and then has been eradicated. Rabies vaccines may well play an important role in a well-regulated control program. As an example of the probable value of the use of vaccines in controlling rabies, a recent article comes to attention from Hungary concerning a report on rabies in that country which has been in evidence for many years in spite of vigorous measures for its control. It has only been in the past few years when compulsory prophylactic vaccination was instituted in certain areas that the disease has been reduced to a practical minimum. In this case, of course, vaccination was only an added means of control, the other sanitary police measures being vigorously pursued at the same time.

Your Committee desires to state emphatically that the use of rabies vaccines alone, no matter how effective, cannot control the disease, but that such vaccines can be used to advantage in some communities and under certain conditions in conjunction with other
standard measures. The state-wide compulsory vaccination of dogs is not considered advisable as practiced at the present time. Its compulsory use in restricted communities should be approached with caution and only on a sound basis of administration.

Recommendations

Your Committee recommends:

(1) That sufficient copies of this report be printed and distributed to the various state live stock sanitary authorities, state health officials, and officials of the Bureau of Animal Industry of the U. S. Department of Agriculture and the U. S. Public Health Service, together with a letter of transmittal signed by the President and Secretary of this Association.

(2) That the Rabies Committee be continued and that a sufficiently large selected personnel be appointed to look further into the subject.


Replies were received from the 48 states, the District of Columbia, and the City of New York.

U. S. DEPARTMENT OF AGRICULTURE
Bureau of Animal Industry

ZM-222
May 8, 1939

Dear Sir:

The Bureau of Animal Industry is desirous of obtaining information on the method of control of rabies in your state. It will be greatly appreciated if the information on the attached questionnaire can be forwarded to the Bureau. We will be pleased to furnish you with such information as might be compiled from this questionnaire.

Thanking you in advance, I am,

Very truly yours,

J. R. MOHLER,
Chief of Bureau.

Inclosure
QUESTIONNAIRE ON CONTROL OF RABIES

State ........................................ Date .........................................................
(Questions may be answered on separate sheet of paper under number of questions.)

1. What authority in the state is charged with the control of rabies?
   (i.e., State Health Department, Live Stock Sanitary Board, etc.)
   ......................................................................................................................
   ........................................................................................................................

2. Under what provision of law does this authority act? (Quote law or enclose copy.)
   ......................................................................................................................

3. How does the authority operate? Does the state or community take complete charge of outbreaks, or is responsibility divided?
   ......................................................................................................................
   ......................................................................................................................
   ......................................................................................................................

4. How are funds obtained for rabies control work? (From regular appropriations, special appropriation for rabies control, dog tax fund, etc.) Are sufficient funds available for this work?
   ......................................................................................................................
   ......................................................................................................................
   ......................................................................................................................

5. What method of control is adopted? (Forward copy of control regulations if available.)
   ......................................................................................................................
   ......................................................................................................................
   ......................................................................................................................

6. How is control method enforced?
   ......................................................................................................................
   ......................................................................................................................

7. Is prophylactic vaccination of dogs compulsory in your state?
   If so, send copy of law.
   ......................................................................................................................

8. If prophylactic vaccination of dogs is not compulsory, is it used otherwise? (State how used and to what extent.)
   ......................................................................................................................
   ......................................................................................................................
9. Number of cases of rabies reported in your state in calendar year 1938:

Dogs ............................................
Cattle ............................................
Horses ............................................
Sheep ............................................
Swine ............................................
Man .............................................

10. Comments:

Name and address:

1. What authority in the state is charged with the control of rabies?

(i. e., State Health Department, Live Stock Sanitary Board, etc.)

State Department of Agriculture .................................. 21
State Department of Health ........................................... 8
State Dept. Agr. and State Dept. Health .......................... 15
County and mayor of municipalities ............................... 1
City Department of Health (New York City) ....................... 1
Department Agriculture and Conservation ....................... 1
Department Agriculture and local Boards of Health ........... 1
All law enforcing officials ......................................... 1
No one specifically charged ....................................... 1

2. Under what provision of law does this authority act? (Quote law or enclose copy.)

Copies of the law or laws, or excerpts from the same, or the reference to the law were received, with a few exceptions, from all the states.

3. How does the authority operate? Does the state or community take complete charge of outbreaks, or is responsibility divided?

State Department of Health ........................................... 2
State Department of Agriculture .................................... 10
State Department of Agriculture and/or Health, together with local, county and city officials .................................. 33
State Departments of Health and Agriculture, and County Health officials and Rabies inspector ............................. 1
State and City Health Departments (N. Y.) ....................... 1
County and Municipal officials ..................................... 2
All law enforcement officers (State, County, City, School Trustees) .............................................................. 1
4. How are funds obtained for rabies control work? (From regular appropriations, special appropriation for rabies control, dog tax fund, etc.) Are sufficient funds available for this work?

Regular appropriations in state, city or county .................................................. 28
Regular appropriations in state, plus dog tax .................................................. 6
Dog tax .................................................................................................................. 8
Special appropriation in county and city ............................................................... 2
Fees collected by rabies inspector ......................................................................... 2
No funds available .................................................................................................. 3
No information ......................................................................................................... 1

4a. Are sufficient funds available?

Yes ......................................................................................................................... 13
No ......................................................................................................................... 9
No statement .......................................................................................................... 27
Questionable .......................................................................................................... 1

5. What method of control is adopted? (Forward copy of control regulations if available.)

Compulsory statewide vaccination ........................................................................ 4
Compulsory local vaccination and quarantine ........................................................ 6
Quarantine, vaccinated dogs exempt ..................................................................... 9
Quarantine ............................................................................................................. 31*

*While many regulations specifically mention rabies and methods to be followed in its control, in some of the states rabies control comes under the general regulations for the control of infectious diseases. Under the heading of Quarantine are included the usually employed methods of rabies control, i. e., licensing, impounding of stray dogs, destruction of animals bitten by rabid dogs, impounding of dogs breaking quarantine regulations, etc. Vaccination is encouraged on a voluntary basis in some states while vaccination is used to a considerable extent by veterinarians at the request of individual dog owners.

6. How is control method enforced?

The various states delegate the control of rabies to officials who may be any or all of the following: State Department of Agriculture and Health officials, and local officials, including sheriffs, police officers, county and city officials, local officers, rabies inspectors, range riders, and poundmasters.

7. Is prophylactic vaccination of dogs compulsory in your state? If so, send copy of law.

No ....................................................................................................................... 40
Yes ......................................................................................................................... 4
Yes, in outbreaks .................................................................................................. 6
8. If prophylactic vaccination of dogs is not compulsory, is it used otherwise? (State how used and to what extent.)

In 9 states vaccinated dogs are not subject to quarantine restrictions 21 days after vaccination. Vaccination clinics are held in some towns and vaccination is officially encouraged and recommended in some instances in a quarantined area. It also is used to a considerable extent by veterinarians at the request of individual dog owners.

9. The number of cases of rabies in each state during the calendar year 1938.

Cases were diagnosed in dogs, cattle, horses, sheep, swine, cats, goats, coyotes, deer, mule, bobcats, foxes, squirrels, wolf, skunks, pony, and man.

The following table gives the summary of cases in the states that reported:

### RABIES IN THE UNITED STATES BY STATES DURING THE YEAR 1938

<table>
<thead>
<tr>
<th>State</th>
<th>Dogs</th>
<th>Cattle</th>
<th>Horses</th>
<th>Sheep</th>
<th>Swine</th>
<th>Cats</th>
<th>Goats</th>
<th>Miscellaneous</th>
<th>Man</th>
<th>Total</th>
<th>Remarks</th>
</tr>
</thead>
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<td>No</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td>2</td>
<td></td>
</tr>
<tr>
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<td>Present, but can not make reliable statement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>1</td>
<td></td>
</tr>
<tr>
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<td></td>
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<tr>
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<td>50</td>
<td>3</td>
<td>56</td>
<td>4</td>
<td>30</td>
<td>6</td>
<td>Coyote 3, Deer 1, Bobcat 2</td>
<td>4</td>
<td>1735</td>
<td></td>
</tr>
<tr>
<td>Colorado</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<td>0</td>
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<td>0</td>
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<td>0</td>
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<td>41</td>
<td>1</td>
<td>Fox 1</td>
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<td>606</td>
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<tr>
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<td>63</td>
<td>3</td>
<td>6</td>
<td>16</td>
<td>21</td>
<td>0</td>
<td>Fox 1, Squirrel 1</td>
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</tr>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>Squirrel 1, Skunks 3, Wolf 1</td>
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<td>18</td>
<td></td>
</tr>
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<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Skunks 2</td>
<td>0</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
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<td>1</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>Foxes 5</td>
<td>0</td>
<td>81</td>
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</tr>
<tr>
<td>Louisiana</td>
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<td>0</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
<td>164</td>
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</tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
<td>18</td>
<td></td>
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## Rabies in the United States by States During the Year 1938—Continued

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<tr>
<th>State</th>
<th>Dogs</th>
<th>Cattle</th>
<th>Horses</th>
<th>Sheep</th>
<th>Swine</th>
<th>Cats</th>
<th>Goats</th>
<th>Miscellaneous</th>
<th>Man</th>
<th>Total</th>
<th>Remarks</th>
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<td>Michigan</td>
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<td>21</td>
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<td>0</td>
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<td>3</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Present, but no statistics available</td>
<td></td>
<td></td>
<td>Last case in 1925</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
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</tr>
<tr>
<td>N. H.</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>“About a half-dozen cases”</td>
</tr>
<tr>
<td>N. J.</td>
<td>565</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>2</td>
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<td>2</td>
<td>575</td>
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<tr>
<td>New Mex.</td>
<td>Appx.</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
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<td>103</td>
<td>Rabies introduced 6 mos. ago by dog from Mo.</td>
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<td>Ohio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>Present, but no data available</td>
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<td>Oklahoma</td>
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<td>Penna.</td>
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<td>1</td>
<td>9</td>
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<td>4</td>
<td>510</td>
<td>49% in Phila. or 0.3% area of State</td>
</tr>
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PRESIDENT AXBY: Dr. Schoening, I want to represent this Association in thanking you for this report. It was worth a lot. It is the very thing we have been looking and listening for, and I am sure these recommendations will be carried out by the Executive Committee, and will meet a long sought want. So again, I thank you.

The next paper is "Rabies Control from the Clinician's Viewpoint," by J. V. LaCroix, editor, "The North American Veterinarian, Evanston, Illinois. Dr. LaCroix. (Applause.)

RABIES CONTROL FROM THE CLINICIAN'S VIEWPOINT


The title, Rabies Control from the Clinician's Viewpoint, is a good one and it could have served as a vehicle for an interesting report. Unfortunately, time was not given me for the circulation of a questionnaire among several hundred practicing veterinarians located in urban and rural communities, to make this possible. Under the circumstances, I can offer only one practitioner's point of view on the subject.

In the following I shall refer at length to the use of rabies vaccine for the reason that this vaccine and those who use it are being severely criticized. Some of the critics would have their "public" believe that all who employ rabies vaccine, or rather "rabies serum" as many of them designate it, are in a conspiracy with the laboratories that produce it for the perpetration of a racket; that as a result, rabies is spread by wholesale vaccination and the lives of our innocent little children are being jeopardized.

It is the attitude of many careful and capable veterinary practitioners that an outbreak of rabies always has a bad effect on practice. No one is indifferent to the increasing hazards that rabies provides. The most astute diagnostician, with a background of valuable experience in coping with this disease may be caught unaware and expose himself to
infection in the examination and treatment of dogs, as well as of horses and cattle. The early manifestations of rabies are not always typical and since the saliva of infected animals is virulent several days before clinical symptoms are manifested, the veterinary practitioner is never certain regarding possible exposure if he makes routine examinations of the mouths of his patients without always taking the precaution to wear rubber gloves. Obviously, therefore, veterinarians would prefer to have nothing at all to do with rabies and welcome the day when this fatal disease will have been eradicated from the United States.

Whenever an outbreak of rabies occurs in the average community, unless that community is sparsely populated, the veterinary practitioner is seriously concerned with stamping out the scourge as quickly as this can be accomplished. There is rather general agreement as to the manner in which this may be done but difference of opinion exists regarding the relative importance of the several means at our command for accomplishing the purpose.

Within the past two years an Illinois veterinary practitioner admitted a rabid dog to his hospital for examination and observation. He obtained an accurate account of the activities of this rabid animal and charted an area within which he thought canine pets might have been bitten by the dog. With another veterinarian he promptly vaccinated all of the dogs within this area without cost to the owners. All of the owners in this area were carefully instructed to keep their dogs confined for a period of about a month and to report any sickness or disturbance that might affect their dogs during the period. Not one additional case of rabies developed within that territory. This unorthodox method of handling the situation is mentioned simply to indicate the attitude of one successful practitioner toward rabies.

Rabies is a reportable disease in most localities in this country and when a case is reported in a sizeable center of population, the local press often features such a report and in some instances, politically minded health officers have
seized the occasion for self-advancement, to the end that rabies scares followed the announcement of quarantine regulations. In Chicago, not long ago, the health commissioner was quoted as considering the shooting on sight of all loose dogs in the city. This sort of business is inimical to the interests of veterinary practitioners and they are naturally anxious to prevent its occurrence. But, because of the absence of clear-cut recommendations that may be applied, the individual practitioner working with, or without the cooperation of local health authorities, is seriously handicapped. In some localities because of the good results that seem to have attended the use of the single-dose prophylactic vaccination of large numbers of dogs year after year, a good many veterinarians recommend such vaccination as being one of the best single control measures. Others who have observed that one average single dose of rabies vaccine did not protect dogs against rabies when they were bitten two or three or four months after such vaccination, consider such prophylactic treatment as being wholly inadequate.

It is my opinion that most veterinary practitioners are opposed to compulsory vaccination with annual single-dose vaccination as a practical measure to prevent the occurrence of rabies among dogs.

At a meeting of the Chicago Veterinary Medical Association on December 13, 1938, that organization went on record as stating, in part:

"Vaccination has its place in the control of rabies when properly employed. Certainly rabies vaccine is the one agent that is relied upon to save life when exposure to this disease has resulted. The same product rationally employed has served equally well to prevent rabies. Rabies vaccine could be put to better use in this community. Based on work done at several Pasteur institutes in the French colonies, notably that of Remlinger during the past twelve years, with observations on vaccinated dogs; at the United States Army Post, Fort Sam Houston, during 1937; on work done in Tennessee during 1936; and upon the excellent work done by Webster and associates quite recently, it is apparent that an improvement can be made on

3 Stanford, No. Am. Vet., 19 (1) 1938, 47-49.
the single dose vaccination that has been employed generally for the protection of dogs against rabies.

"For immunizing dogs against rabies that have not received several doses of rabies vaccine within six months, it is proposed that the following dosage be employed at three to five-day intervals, the first two doses to be given subcutaneously and the third dose intraperitoneally.

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<thead>
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<th>Dogs Under 22 Pounds</th>
<th>Dogs Over 22 Pounds</th>
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<tr>
<td>First dose</td>
<td>5 c. c.</td>
<td>10 c. c.</td>
</tr>
<tr>
<td>Second dose</td>
<td>10 c. c.</td>
<td>20 c. c.</td>
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<tr>
<td>Third dose</td>
<td>15 c. c.</td>
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"For maintaining immunity it is to be recommended that dogs weighing 22 pounds or under receive 10 cubic centimeters of rabies vaccine at six-month intervals, and dogs weighing over 22 pounds receive 20 cubic centimeters of vaccine, twice annually.

"Where dogs have been bitten and owners wish to treat them, it is recommended that such owners be informed regarding the hazards of treating animals that have been bitten about the muzzle, in the region of the upper lip, and wherever extensive laceration of tissue has resulted. In all treated animals, the patient should be quarantined in a veterinary hospital or equally good place for a period of at least thirty days, and longer where there is reason to fear vaccination may not protect.

"The method of treatment, including dosage proposed in such instances, follows: It is suggested that no dogs be treated unless such treatment be started within three days after wounds have been inflicted, and not later than 24 hours after wounds of the face and upper lip have occurred.

"For dogs weighing 22 pounds or less, it is proposed that a 5 cubic centimeter dose of vaccine be given morning and evening on the first and second days and that ¼ cubic centimeter per pound of dog weight of rabies vaccine be given intraperitoneally on the third day, and this dose be repeated on the fifth day with no treatment on the fourth day.

"For dogs weighing 22 pounds or more, it is proposed that a 10 cubic centimeter dose of rabies vaccine be given subcutaneously on the first and second days of treatment. On the third and fifth days vaccination is to be given intraperitoneally, graduating the dosage at ¼ cubic centimeter for each pound of weight of dog."

Pending the completion of more dependable information on the value of rabies vaccine, as to dosage and frequency of
repetition necessary to maintain a safe and practical immunity among dogs that are properly cared for, we might do well to consider the application of methods similar to those of Remlinger and Bailly as suggested by the Chicago Veterinary Medical Association. We need not wait for the further improvement of rabies vaccine to begin this. There is not so much difference in available rabies vaccine for human and veterinary patients to justify the attitude reflected by some, that one is immensely useful to save human life and the other worthless.

Research of a clinical nature, employing street virus with the infliction of minor wounds similar to those which occur in natural exposures among dogs, would yield more dependable information than all of the reports that have been based on work with fixed virus. We might contribute more effectively than we do to the conservation of our live stock interests if we increased our knowledge regarding the practical application of rabies vaccine pending perfection of revolutionary methods in its production that may enable its use to be followed by results that will satisfy all.

Probably no veterinarian will fail to acknowledge the great importance of the elimination of unwanted dogs that are compelled to eke out an existence wherever there is human abode. Veterinarians, generally, agree that effective and sensible quarantine measures are essential for stamping out rabies enzootics. Those who are qualified by experience recognize the fallacy of dog muzzling edicts and they do not expect effectual cooperation on the part of indulgent dog-owning urbanites in carrying out quarantine regulations.

Because of divided opinion among both medical men and veterinarians on the subject of rabies prevention; exploiters, cultists and charlatans fan the flame of dissention and hamstring isolated practitioners when individual effort might otherwise improve on methods that are now in vogue.

PRESIDENT AXBY: Following right in line, we now have, "Some New Facts on Rabies Control in Europe," by Adolph Eichhorn, director, Animal Disease Station, Beltsville, Maryland. Dr. Eichhorn. (Applause.)
SOME NEW FACTS ON RABIES CONTROL IN EUROPE

By Dr. Adolph Eichhorn, Director, Animal Disease Station, Beltsville, Maryland.

I was particularly interested in the excellent report delivered here by Dr. Schoening and signed by the members of the Committee on Rabies for this Association. Unquestionably these recommendations, if carried out, would result in the eradication of the disease. However, when we look back on the many years of discussions and addresses on this subject before various associations, we have to realize that really not much progress has been made pertaining to enforcing recommendations which were made many years ago, and which coincide with the recommendations made today by the Committee.

Thus, it resolves itself, apparently, into the fact that our knowledge pertaining to this disease has been such for many years that if certain measures are enforced, the disease would no longer be a problem for live stock sanitarians and veterinarians. We know very well that in certain countries, as pointed out by Dr. Schoening, the disease has been successfully eradicated, but when we analyze the procedure which resulted in these wonderful results, we have to agree that in those countries the measures which were promulgated were actually put into operation.

I do not think that we in the United States have adopted sufficiently strict measures to gain hoped for results as far as the control or eradication of the disease is concerned.

I want, just for a few minutes, to speak about two countries where work has been done on rabies eradication. In one the vaccination program has been carried out, together with very strict measures as are always recommended in any effort to eradicate rabies; and in the other, a country where vaccination is not practiced at all, but where such measures as adopted are stringently enforced. Any person who is reluctant to obey or who does not other-
wise enforce the measures is locked up for a period of years. I refer here to Germany.

Now, we know very well that in European countries, and in England, as pointed out by Dr. Schoening, the disease has been eradicated since 1903. However, because the quarantine regulations have been broken by aviators, a single dog within one year infected 150 other dogs. Only through strict measures was the disease again eradicated. We know the Scandinavian countries are free of the disease through effective law enforcement.

Then, let us consider Germany again. We find that up to the World War, the first World War, rabies was practically eradicated from that country. The borders of Poland, where stray dogs could pass the border guards, did show isolated cases. I will come back and discuss for a little while what happened in Germany during the war, and what has been done toward again eradicating the disease from that country. I fully realize that it required Hitlerism to accomplish such ends, and God protect us from that here, but I do want to emphasize that control can be achieved by stringent measures.

Hungary had a widespread occurrence of rabies for many decades, yet there were always sanitary police and quarantine measures in force. They were not more stringent than in more recent years when efforts have been made to apply these measures, together with vaccination.

The disease has been eradicated from that country within the brief period of five years. Thousands of cases of rabies occurred in Hungary prior to 1935 and during a ten year period between 200 and 300 deaths occurred. Only a single death occurred in 1938, and so far this year not a single case has been reported.

The vaccination program was inaugurated in 1935, but do not forget that it was not vaccination alone. The Committee has brought to your attention that other measures must be equally in force. Hungary was divided into sec-
tions, under government supervision and, during a four-year period the entire country-wide compulsory vaccination program was carried out. I have already told you about the results. Not one case of rabies has occurred in human beings in the past two years as compared with numerous outbreaks prior to the vaccination program.

The committee pointed out in the report that rabies can be eradicated with the following measures: (1) taking care of stray dogs, (2) proper quarantining in a quarantined area of the dogs, and (3) vaccination program. The vaccination program, because of the bureaucratic nature of the regulatory work in those countries, is carried out systematically. County veterinarians are assigned to this work. It is carried out in a very exacting manner, and the vaccine is always as near a uniform potency as possible at the present time.

Now, I want to give some additional information on Germany. Prior to the current war practically no cases of rabies had occurred, but a late issue of the “Berliner Volkenschrift” announces regulations and an official regulatory edict was issued by the government on reinforcing the measures which existed in Germany prior to the war pertaining to the handling of the rabies situation. Outbreaks of the disease since the war have appeared principally in the northeastern sections of Germany where the invasion of Poland has taken place. You can readily realize that, as a result of such a war, with the movement of armies and the migration of people that the dogs had much more freedom to move about than when a careful border control was maintained.

Quite a large number of cases of rabies developed in Pomerania, East Prussia, and other parts of Germany which were free of rabies prior to the war as a result of this condition. They felt the necessity of promulgating regulations toward the control of the disease, and required strict measures. So strict, in fact, that we could not hope to enforce them in the United States.
I have an abstract of this regulation, and I will explain it to you in a brief form. As soon as a case of rabies is established by the veterinarian and confirmed by the regional laboratory, there is immediately inaugurated a very strict quarantine for the whole locality or district. A district corresponds to one of our counties. The quarantine is very strictly enforced. Any dog which dies or is suspected of having rabies must be subject to a thorough examination. If the dog has bitten human beings, only four of the laboratories can be utilized. However, if no human beings have been bitten, the usual veterinary governmental laboratory can be called upon to make the examination.

The quarantine measures are very strict, but before proceeding on that, I want particularly to point out this provision: A dog suspected of even being exposed to the disease, providing he isn't killed, has to be placed in a cage provided with iron bars, locked up, and the key delivered to the police department. Where no such cage is available, a room may be provided. This room must be such that observations can be made from time to time of the dog which is fed through a window provided with bars. The key, in this instance, is also delivered to the police authorities. The quarantine lasts for a minimum of three months. The quarantine is then lifted if no other case of rabies occurs.

For examination purposes, the veterinary authorities are directed to take the head, wrap it with rags saturated in mercury chloride solution, and tie it thoroughly with wire. Then another waterproof cloth and an absorbing material is wrapped around the bundle and it is placed in a box marked "dangerous material for immediate delivery." "Immediate delivery," means just that. Then, of course, they have to provide for the stray dogs. Believe me, they do not mince words! All stray dogs, regardless where they are, must be shot at sight. They authorize the border guards, police authorities lessees of preserves, and hunters to shoot the dogs.
In large cities they provide proper dog catchers and pounds, and the stray dogs are all gathered and safely disposed of.

The penalties are very strict. You read from time to time that even minor offences today in Germany are punished by years and years of prison sentences. Well this applies also to violators of any regulations pertaining to rabies. I can assure you that in countries where it is possible to enforce such measures, vaccination is not necessary, and that if Germany will again protect its borders against migration that no difficulty will be encountered in eradicating rabies. Control in Germany is easy because they are in a position to organize the entire country and enforce such measures as the committee here presented. We never can hope to carry out those measures unless a really concerted effort is made.

Maybe it might be possible if we accept the results accomplished in Hungary during the last five years as authoritative. I believe that they are authentic. Perhaps a happy medium can be developed in this country using a vaccination program along with stringent regulation for the eradication of the disease. We cannot lose sight of the fact that the records indicate that the number of cases of rabies often increases over previous years. Rabies, like equine encephalomyelitis, after a period of years, is susceptible for a greater number of animals, and a mild exposure is sufficient to produce the disease.

But going back to the vaccination just for a minute, I was very much impressed with the paper I heard by Dr. Johnson only the day before yesterday before the Research Workers' Association. He reported that in 100 dogs—the experiment is not yet concluded—approximately 60 per cent of the controls, that is the animals which had not been vaccinated, had developed rabies. However, among those which had been vaccinated, only slightly over 20 per cent had developed the disease. I think that is a very striking result if we consider that there is no absolute uniformity in the
vaccine. The preparation is uniform because there are certain requirements the manufacturers must meet as to the age of the vaccine, how it is kept, and its virus content.

We must realize that vaccine, as it is marketed at the present time, is a rather crude, unstandardized product. We have to guess at the virus contents as we formerly did when we used brain tissue vaccine for the preventive vaccination of horses against equine encephalomyelitis. However, with the development of the chick-propagated vaccine, we have a way to standardize it, and the results are really striking.

If we could develop a vaccine of that sort for rabies vaccination, I believe our problem would be solved. Let us hope that the investigators will finally strike upon a method whereby this might be possible.

It is a fact that the results are not really definite, although they are rather promising. The same dosage, of course, has not been uniformly used, and it has not been carried out sufficiently to determine exactly what the dosage should be. We just heard Dr. LaCroix recommend a certain dosage, but I do not believe that is backed up by very dependable research experiments. I was very much interested in his remarks pertaining to the work of Remlinger. I followed that work in North Africa very carefully for many years. They recommend a two-dose vaccination, and the results are really striking. However, because they are not in a position to employ the other measures which are very necessary together with vaccination, they have not made very great headway in the eradication of the disease. The vaccinated dogs are probably protected, but no definite progress has been made in the eradication of the disease.

I believe that the recommendation of this Committee is excellent, and I hope along with President Axby, that the recommendations will be carried out, yet I am rather dubious about results until we take this problem seriously and carry out a nation-wide campaign against it. Local efforts along this line will not bring results. We must do
it nationally either through the Bureau of Animal Industry or some other organization. We cannot hope to eradicate the disease from this country if we do not go at it in a serious way, and enforce measures with or without vaccination. Certainly, it is a blot on civilization that we still, from year to year, have to discuss this problem.

PRESIDENT AXBY: Thank you Dr. Eichhorn. The further the program goes, the better it gets.

POULTRY SESSION

PRESIDENT AXBY: We are now entering the proceedings of the Poultry Session. The first paper is "Field Control and Eradication of Avian Tuberculosis in Poultry and Swine in the Midwest," by J. P. Simmons, Bureau of Animal Industry, Federal Building, Des Moines, Iowa. Dr. Simmons. (Applause.)

FIELD CONTROL AND ERADICATION OF AVIAN TUBERCULOSIS IN POULTRY AND SWINE IN THE MIDWEST

By J. P. SIMMONS, United States Bureau of Animal Industry.

Tuberculosis of poultry exists to a greater or less extent in all sections of the Corn Belt and doubtless in many other places. As an indication of the extent of avian tuberculosis, we rely upon the records furnished by the meat inspection service of the Bureau of Animal Industry, which show clearly how heavy this infection is among swine, particularly in some sections. Beyond this, competent farm inspections, including autopsies and the tuberculin test, by veterinarians of the State and Bureau regulatory forces, give further evidence that something more than as yet been done must be undertaken to protect the poultry and swine industries.

I assume we all know that, with the suppression of tuberculosis in the ordinary farm flock, a corresponding decrease of the disease in swine should be realized.
The regulatory forces in the various states, in cooperation with units of the poultry industry and other interested groups, have outlined programs which contemplate a more intensive and effective campaign against avian tuberculosis.

The producer of poultry has never been given the incentive to eradicate disease from his flock that exists in the case of the farmer who has a tuberculous cow or one affected with Bang's disease. He has taken the loss himself. This fact partly explains why the conditions are as we find them today.

The accumulated data, available to all persons interested in the suppression of poultry disease, show the presence of tuberculosis spread quite generally over the Corn Belt. The distribution is spotted, however, by 30 to 60 per cent of flock infection and as high as 14 per cent of bird infection in some localities to as low as 2 per cent bird infection in others, with a corresponding reduction in flock infection. Of course, we realize that many diseases are susceptible to certain prescribed treatment—such as raising the chicks on clean ground, marketing the old fowls at suitable periods, and observing other precautions well known to all of us, the keynote of which is that no fowl will live and develop satisfactorily in too close association with its own excreta.

In certain sections throughout the country there are establishments where poultry is processed and this practice is spreading. With the evisceration and inspection of poultry, it is logical to assume that there will be less outlet for the diseased and undeveloped fowl. When such condition arises, packers will be compelled, in self-defense, to buy strictly upon grade with the obvious results that the producers will anticipate more clearly the needs of the market and raise birds accordingly.

We all appreciate that marketing of birds has been somewhat handicapped by the consumers' knowledge, gleaned from personal experience, that poultry in many instances has been found to be infected with tuberculosis. The processing of poultry under competent inspection should not
only tend toward the control of disease but also be a factor in the stimulation of consumer demand.

The large packer of poultry looks to a long-time program and will agree to buy strictly upon grade, but oft-times in certain localities he encounters competition of small and possibly itinerant buyers and meets their prices. Thus the fowl that should have been burned upon the farm as a cull is marketed for food. The greatest control available is the buying of poultry on grade.

There are, without doubt, a general awakening and consciousness that in defense of the industry the suppression of poultry diseases is essential. The extension of information on disease and sanitation through poultry clinics, held by veterinarians in the presence of the producer of poultry, where the latter can see his birds taken apart and note the process of disease or presence of parasites, is doubtless one of the most convincing means of producing progress in disease control. Beyond this, meetings, at which producers, hatcherymen, and processors attend and hear talks by competent persons and see charts illustrative of disease and its damage, with available literature in other instances, should do much to decrease disease among poultry. We have already drawn attention to the effect that the processing of poultry, under competent inspection, would have on disease suppression. The present may or may not be the time for this.

I believe at this time all persons, whose duty it is to endeavor to bring about a more healthful condition among poultry, feel that the right course is being pursued and that the machinery, which has been set up for some time and improved with increased knowledge of necessity and experience, will be instrumental in reducing disease materially from year to year.

There is, however, a great need for an up-to-date talking motion picture film to supplement the present silent one in dealing with the eradication of avian tuberculosis and the effect that the elimination of this disease in poultry will
have in reducing the number of infected swine. By the use of such films, many people can be interested in the program who would be difficult to reach by other means. It is understood that the Bureau is favorable to the production of a modern talking picture on the subject.

PRESIDENT AXBY: Thank you, Dr. Simmons. The next paper is "Progress of the National Poultry Improvement Plan with Special Reference to Pullorum Disease Control," which will be presented by Berley Winton, senior poultry husbandman, in charge, Poultry Husbandry Investigations, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

DR. BERLEY WINTON: Mr. Chairman, members of the United States Live Stock Sanitary Association: I feel that it is indeed an honor to be able to address you on the subject which has been assigned to me. I want to say, before I begin my discussion, that any attempt made on the part of the live stock sanitary authorities or veterinarians to control poultry diseases in this country should be received gratefully by producers and all of those who are connected with the poultry industry. It is estimated that we have here in this country a loss of more than $150,000,000 annually from diseases in poultry. Much of this loss might actually be controlled if we could muster the efforts and energies of all people who are directly or indirectly concerned in one way or the other with the poultry industry. Your efforts along that particular line are destined to do a great deal of good.

PROGRESS OF THE NATIONAL POULTRY IMPROVEMENT PLAN WITH SPECIAL REFERENCE TO THE CONTROL OF PULLORUM DISEASE

By BERLEY WINTON, Senior Poultry Husbandman, Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C.

Although the need for a National Poultry Improvement Plan was expressed as early as 1925 it was not until in 1935 that a systematic, coordinated program among the states was agreed upon and initiated.
The value of this program can more nearly be appraised if we understand clearly its objectives. They are (1) to improve the production and breeding qualities of poultry, (2) to reduce losses from pullorum disease, and (3) to identify with uniform terminology the breeding stock, hatching eggs, and chicks which are produced in conformity with its provisions.

Characteristics of the Plan

The National Poultry Improvement Plan has certain outstanding characteristics that are worthy of notation. They are as follows:

1. It is nation-wide in scope. That is, it applies to all the states in the same manner.

2. It is optional on the part of states and industry members within states. In this particular respect this program differs from those in progress in many other countries at the present time. However, all participating members of the industry obligate themselves to comply with its provisions.

3. It is administered cooperatively by official state agencies and the Federal Bureau of Animal Industry. The duties of both agencies are outlined clearly in formal memoranda of agreements. Briefly stated the official state agencies direct, supervise, and are responsible for flock selection and pullorum-testing work and the Federal Bureau is obliged to coordinate the work among the cooperating states.

4. Five progressive breeding stages, namely, U. S. Approved, U. S. Verified, U. S. Certified, U. S. Record of Performance, and U. S. Register of Merit, and three progressive pullorum-control classes recognized as U. S. Pullorum-Tested, U. S. Pullorum-Passed and U. S. Pullorum-Clean are provided for. This number of breeding stages and pullorum-control classes make it possible for any member of the poultry industry to participate in the plan if he is sincerely interested in improving the production and breeding qualities of his chickens and in reducing losses from pullorum disease.

5. Minimum requirements are established for each breeding stage and each pullorum-control class. The particular breeding stage and pullorum-control class in which one participates is contingent upon the extent of improvement work previously done and the circumstances that govern his operations.
6. Official terminology is provided and is applicable to all those who are participating in the plan.

7. All flock selecting, pullorum testing and inspection work is done by those authorized to perform these duties by the respective official state agencies.

**Economic Considerations**

During the past several years close to 65 per cent of the total income derived from the poultry enterprise has come from the sale of eggs. Yet the average yearly production per hen has amounted to only about 100 eggs. During this same period many demonstration flocks located in different states have produced an average of 200 or more eggs per bird. With an increase from 100 to 200 eggs per hen the labor income, as revealed by records kept on demonstration flocks, has increased by approximately 400 per cent. This low egg production is recognized as a distinct handicap to a more profitable enterprise. This monetary factor, more than any other, is responsible for stimulating more interest in the development of flocks with greater egg production and increased breeding potentialities.

The second handicap to a more profitable poultry enterprise which is being corrected by placing into operation the National Poultry Improvement Plan is a reduction of pullorum infection among chicks by following an official program of pullorum testing. This infection not only reduces hatchability but is directly responsible for heavy losses among chicks.

You will recall that until recently it was common experience for hatcherymen to have a 60 per cent hatch and for farmers to lose an average of 25 per cent or more of their chicks. But hatchability has been increased by 10 to 15 per cent and the loss of chicks has been reduced to 10 per cent or under during the past few years. Much of this improvement in hatchability and reduction in chick losses can be credited to the development, improvement, and extensive application of effective methods of testing for pullorum disease.
It is indeed fortunate for the poultry industry that scientists have developed techniques which make it possible to increase the yearly production of chickens and to reduce losses from pullorum disease. It is also important to observe that both of these handicaps can be corrected simultaneously in an improvement program. With this knowledge it seems as though there is little, if any, excuse for any one using stock for breeding purposes which has not been selected for desirable commercial qualities and which has not been tested for pullorum infection.

**Breeding Methods**

It can be said without fear of contradiction that much more difficulty is experienced in improving the production and breeding qualities of chickens than is encountered in the control of pullorum disease. In poultry breeding operations the most successful techniques involve not only individual selection, but also the more expensive procedures of trapnesting, pedigreeing, and progeny testing for one or more commercial qualities such as high egg production, egg weight, and body weight.

The most practical application of breeding methods calls for the individual selection of breeding stock on the part of commercial hatcherymen and trapnesting, pedigreeing, and progeny testing on the part of breeders participating in the most advance breeding stages of the plan. The most promising blood lines of these specialized breeders are diffused in hatchery flocks through the purchase and use of cockerels by commercial hatcherymen.

One example will illustrate the far-reaching effects of the possibilities of these procedures. Last spring one of the largest breeders in the advanced breeding stages of the plan sold more than 18,000 day-old pedigreed cockerels and several thousand pedigreed hatching eggs from his 53 individual (male) U. S. R. O. P. matings. Most of these went to hatcherymen in his own State for the express purpose of improving the qualities of chicks sold to farmers. By way of further
explanation, I might say that on this same farm last fall there were only 42 reactors among 11,988 birds officially tested for pullorum disease or slightly more than one-third of one per cent.

**Pullorum Control Features of the Plan**

Since your interest is primarily in the pullorum-control features of the national plan I want to discuss with you in more detail this phase of the program.

1. All pullorum-testing work is to be done under the direction of live stock sanitary authorities, officials of the state college of agriculture or similarly authorized state agency.

2. The plan provides for pullorum testing agents or trained laymen to do testing work in the lowest pullorum-control class on their being authorized to perform this service by the official state agency. Eligibility is determined by applicants passing an examination on a course of training prescribed by the live stock sanitary authorities or officials of the state college of agriculture.

3. All testing work in the two advanced pullorum-control classes must be done by a live stock sanitary authority, an official of the state college of agriculture, or similarly authorized state employee.

4. Definite regulations with respect to the age and class of chickens to be tested and with respect to the sanitary practices to be followed on the farm and in the hatchery are included in the provisions of the plan. In addition, definite rules are established for the exchange of breeding stock, hatching eggs, and baby chicks among members of the industry who are participating in the program.

The technique of testing for pullorum disease is not complicated by genetic and biological factors but has been reduced to a relatively simple, inexpensive practice, the efficiency of which is based upon (1) the training of the person doing the work, (2) his ability and willingness to follow the best known technique in testing work, and (3) the full cooperation of flock owners, breeders, and hatcherymen in following a prescribed procedure with respect to a sanitation program.
In order to keep the pullorum-control program within the realm of practicability and make it applicable to the entire country any one of the following methods of testing for pullorum disease is recognized in the work of the National Poultry Improvement Plan:

1. The standard tube agglutination test.
2. The stained-antigen, rapid, whole-blood test.
3. The rapid serum test.

The stained antigen, rapid, whole-blood method of testing is used the most extensively of the three tests recognized in the plan. The testing methods used by the states during the year ending June 30, 1939, were as follows:

<table>
<thead>
<tr>
<th>Method</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stained antigen, rapid, whole-blood</td>
<td>25</td>
</tr>
<tr>
<td>Tube agglutination</td>
<td>9</td>
</tr>
<tr>
<td>Rapid Serum</td>
<td>1</td>
</tr>
<tr>
<td>All three</td>
<td>1</td>
</tr>
<tr>
<td>Rapid, whole-blood and tube</td>
<td>4</td>
</tr>
<tr>
<td>Rapid, whole-blood and serum</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>42</strong></td>
</tr>
</tbody>
</table>

The National Poultry Improvement Plan does not make it obligatory for a participating member of the industry to engage in both the breeding and pullorum-control phases of the program. However, the Federal Bureau of Animal Industry recommends that both phases of the work be done simultaneously. With the present status of egg production and egg weight among the flocks in this country we believe every breeder, hatcheryman, and flock owner is warranted in taking steps to improve his breeding stock. Furthermore, we advocate that every flock of chickens used for breeding purposes be tested for pullorum disease. The official state agencies in 23 of the 44 cooperating states require breeders and hatcherymen to have their flocks tested for pullorum disease under official supervision in order to participate in the breeding stages of the plan. In 22 states only those who are cooperating in the breeding stages are eligible to qualify for the United States pullorum-control classes. Although it is desirable to conduct both phases of the work it has not
seemed advisable, because of the lack of uniform conditions in the states, to incorporate a provision in the plan making it obligatory.

In states where both phases of the program are conducted it has been found advantageous to select the breeders and take blood samples or do the testing work at the same time. This procedure reduces the number of times the birds have to be handled and consequently lowers the cost of doing the selecting and testing work. Furthermore, the production of the birds is not interfered with to such an extent as when each phase of the work is done on different occasions.

Program of Administration

Scientific investigations at the Agricultural Research Center, Beltsville, Maryland, and elsewhere show that prospective breeding stock can be selected to the best advantage in the late summer and fall. For this reason most of the poultry improvement work with respect to selecting birds for breeding purposes and testing them for pullorum disease is done during the late summer and fall or a brief period of four months. During this time the federal coordinators and representatives of official state agencies are engaged in supervising all of those previously authorized to do flock-selecting and pullorum-testing work. This busy season is followed by the hatching season when it is necessary for federal and state inspectors to devote their time to the inspection of advertising and the inspection of breeding flocks and hatcheries.

In addition to performing the inspection work called for in the plan in order to insure compliance with its provisions state and federal employees conduct an educational program on the subjects of breeding, incubation, pullorum-control, sanitation, and related subjects. During the summer in preparation for the next year's work many training schools for flock-selecting and pullorum-testing agents are conducted.
(a) In 1939 the departments of bacteriology and veterinary science cooperated in conducting training schools for pullorum-testing agents in 22 states and in supervising the work of official pullorum testers and practicing veterinarians in 20 states.

In other words, poultry improvement work is of such a nature as to require constant diligence in order to improve the quality of breeding stock and control pullorum disease.

As a matter of information it should be explained that although the supervision of the National Poultry Improvement Plan has been delegated to the Poultry Section of the Animal Husbandry Division of the Bureau of Animal Industry, the project is administered with the active cooperation of the veterinarians in the Pathological and the Biochemic Divisions of the Bureau.

**Participation in the Plan**

The degree of success attained in the National Poultry Improvement Plan can be measured in part by the extent of participation. The number of states participating has increased from 34 in 1935-36 to 44 in 1938-39. The number of hatcheries has increased from 1,017 to 2,033 and the hatching capacity has grown from slightly more than 38,000,000 to almost 76,000,000 eggs. In 1935-36, 23,813 flocks with a total of 3½ million breeding birds were used to produce hatching eggs. During this past season 42,891 flocks with 8½ million breeding birds were used for this purpose.

In 1935-36 only 30 states participated in official pullorum-testing work in conformity with the provisions of the National Poultry Improvement Plan. Twelve thousand, one hundred and thirty-eight flocks with a total of 2,053,159 breeding birds were tested for pullorum disease. This represented only 58.2% of the birds actually selected to produce hatching eggs for those participating in the plan. But in 1938-39 the number of states complying with the pullorum-control phase of the plan had increased to 42 and there were
32,518 flocks with a total of 6,772,031 breeding birds which were tested for pullorum disease. This number represented 78.2 per cent of all birds used for breeding purposes. An estimate, based on a survey made this past year, indicates that there were at least 182,000,000 chicks produced by all those participating in the plan in 1939.

Since the national plan became effective in 1935, 14 states have initiated official pullorum-testing work. In a few states the extent of participation in pullorum-control was previously limited due to local regulations. This condition has caused some of the states to alter their regulations. For example, one of the cooperating states limited its pullorum-testing work originally to that which could be done by licensed veterinarians. Although the veterinarians were in the main well qualified to do the work, hatcherymen did not avail themselves of veterinary service because they could not get the testing work done at the time the breeders were selected and because of the expense involved. In the fall of 1938 this particular State Live Stock Sanitary Board modified its regulations to permit trained laymen to do the testing work under the supervision of veterinarians and the number of breeding birds tested increased from 178,305 the preceding year to 355,220 this past year. At the present time, three full-time veterinarians are employed in this State to supervise the pullorum-testing work and to assist with the inspection of hatcheries during the hatching season.

During the past year 1,008 persons were given permits by official state agencies in 22 states as pullorum-testing agents. As a result of their adopting this policy the pullorum-control program has been enhanced greatly and the entire poultry industry has benefited.

It is gratifying to know that many participating members of the industry exceed the minimum requirements in the control of pullorum disease. To illustrate, in one of the mid-western states most of the hatcherymen retested all of their flocks just before the breeding season this past year although it was not required. Cooperating hatcherymen in
several of the states have adopted a 5 per cent maximum tolerance of reacting birds in the United States Pullorum-Tested class, rather than the 10 per cent permitted in the plan.

Similar progress has been made in the breeding phase of the national plan but the lack of time will not permit me to discuss the results of this particular work with you.

In conclusion permit me to emphasize that the National Poultry Improvement Plan has two important phases, namely (1) improving the production and breeding qualities of poultry, and (2) reducing losses from pullorum disease. Each of these phases is supplementary to the other.

Although we are well pleased with the results attained in the work of the National Poultry Improvement Plan we are not satisfied. We shall continue to strive for greater efficiency in the work of flock selection, testing for pullorum disease, and the administration of the national plan.

PRESIDENT AXBY: Thank you, Dr. Winton. That was a fine narration on the National Poultry Improvement Plan, and we are very glad to have had it delivered to us.

The next article is one entitled, "Equine Encephalomyelitis in Avian Hosts," by F. R. Beaudette, poultry pathologist, New Jersey Agricultural Experiment Station, New Brunswick, New Jersey. (Applause.)

EQUINE ENCEPHALOMYELITIS IN AVIAN HOSTS*

F. R. BEAUDETTE, New Jersey Agricultural Experiment Station, New Brunswick, New Jersey.

A knowledge of the host range of the so-called equine encephalomyelitis is important if the reservoir of infection is to be found. Susceptible species may be determined first by artificial inoculations and then natural outbreaks looked for in the inoculations. Careful study of a natural outbreak in any species will indicate whether or not that species

*Journal Series paper of the New Jersey Agricultural Experiment Station. Department of Poultry Husbandry.
enjoys the same status as the horse. The disease may be found in a species in which transmission does not depend on the mosquito. In that event the outbreak could continue through the colder months and the birds serve as a source of infection for mosquitoes. On the other hand, the outbreak in a given species may be seasonal as in the horse but that species may acquire its disease from a source not available to the horse. However, it is not the purpose of this paper to discuss the epizootiology of the disease but only to report some additional outbreaks in pheasants.

**Review of Experimental Infections**

The first experimental inoculation of birds was made by Giltner and Shahan (1933) who succeeded in infecting each of four pigeons with an intracerebral dose of 0.2 c.c. of a 1-50 dilution of virulent guinea pig brain (western type). These showed weakness, ataxia and marked tremors on the third day and died on the third or fourth day. The pigeon brains, in turn, produced the typical disease in guinea pigs. On the other hand, 3 White Leghorn cockerels given the same dose remained normal. Traub and Ten Broeck (2) have used the pigeon for serial passage of the eastern type and have demonstrated a modification of the virulence in consequence of the passages which was not regained by subsequent passage in the horse, calf, sheep, or serial passage through five guinea pigs.

Remlinger and Bailly (3) reported successful infection of a goose (Anser cinereus) by the subdural inoculation of 0.3 c.c. of a 1-50 emulsion of encephalomyelitis rabbit brain. The bird was destroyed on the 11th day and an emulsion of its brain injected subdurally into a guinea pig and two white rats caused typical encephalomyelitis in them and death in 6 to 8 days. Later they (4) report that a second goose given the same dose developed typical symptoms and died on the 14th day. Two rabbits inoculated with the brain of this goose developed typical symptoms on the 6th day and died 2 days later. According to these authors, ducks (Anas boscchas) are less susceptible since some do not become
infected and others recover. In the ducks that die, the virus is demonstrable in some while in others auto-sterilization occurs. Thus, 2 ducks received 0.5 c.c. of a 1-50 emulsion of rabbit brain and both develop the disease; one dying on the 9th day and the other on the 11th day. In neither case was further passage possible. In another test each of two ducks received 0.3 c.c. a similar emulsion subdurally. Both display symptoms but one recovered while the second was sacrificed on the 10th day and the 2 rabbits and 2 guinea pigs inoculated from it developed typical symptoms on the 5th day and died 3 to 5 days later.

The same authors also infected a hawk (Circus rufus) and a blackbird (Turdus merula) by subdural inoculation. The first received 0.3 c.c. of an emulsion of encephalomyelitis rat brain and showed slight symptoms 2 days later and died on the 8th day. Its brain was infectious for a guinea pig. The blackbird received 0.1 c.c. of a 1-50 guinea pig brain and showed symptoms on the 3rd day. It died somewhat later and a guinea pig was infected with its brain. An intraperitoneal inoculation of a second blackbird provoked suggestive symptoms and death, but since subinoculation was negative it was presumed that auto-sterilization has occurred. In all these inoculations, an Argentine strain of virus was used which is presumed to be a western type. The authors also infected pigeons.

Giltner and Shahan (5) state that, in their tests, the hen was found more susceptible than chickens.

Infection of the stork (Ciconia ciconia) was induced by Remlinger and Bailly (6) with either the Argentine (western) or eastern type of virus. A stork given 0.2 c.c. subdurally of a 1-10 guinea pig brain emulsion (Argentine) developed symptoms on the 8th day, and died on the 11th. Subinoculation into 3 guinea pigs resulted in typical symptoms in 6 days and death in 10 days. A second bird given 0.3 c.c. of a 1-10 emulsion of guinea pig brain (eastern type) showed symptoms after 44 hours and died on the 3rd day. A subinoculation into a guinea pig killed it on the 3rd day. Later the same authors (7) reported successful infec-
tion of a tawny vulture (Vultur fulvus Briss) by a subdural injection of 1 c.c. of a 1-40 brain emulsion of a guinea pig dying of western type virus. A guinea pig was given 0.3 c.c. of the same emulsion. Two days later both animals showed symptoms and died on the 4th day. Subinoculation of a rabbit and guinea pig with the bird's brain resulted in death of both on the 4th day. Incidentally, this vulture had previously resisted various doses of rabies (street) virus even though this species has been successfully inoculated at other times.

The few inoculations of pigeons made by Carneiro (8) indicate that, at least, recently isolated strains of the Brazilian virus are not always fatal. One of 3 pigeons given 0.1 c.c. of a thick emulsion subdurally recovered. The reaction of this virus to the eastern and western type is not as yet known.

Howitt (9) used a western type of virus of human origin and was able to infect turkeys and ducks with a 1-1000 dilution. One duck showed symptoms after intradermal inoculation. Young pullets were less susceptible as only a few died after inoculation with non-diluted virus. Gambel sparrows were extremely susceptible and died after an intracerebral inoculation of a 1-1000,000 dilution, and also reacted variably to intradermal and intraperitoneal injections. The Le Conte thrasher was also highly susceptible.

Shahan, Giltner and Schoening (10) found the guinea fowl (Numida meleagris) susceptible to both eastern and western types by intracerebral inoculation.

Ten Broeck (11) has demonstrated that inoculation of the chicken results in multiplication of the virus, but the bird shows no symptomatic evidence of infection. He has also found neutralizing substances in the serum of a turkey. On this evidence he has postulated that birds act as reservoir hosts.
Review of Natural Outbreaks in Birds

The above experimental inoculations give some idea of the avian host-range of susceptibility to equine encephalomyelitis virus. These results, in a measure, adumbrated the natural outbreaks in birds. The first outbreak reported involved pheasants in Connecticut and was recorded by Tyzzer, Sellards, and Bennett (12). This outbreak seems to have started soon after the hurricane of September 21, 1938, and at the time dead wild birds were found on the premises. The birds exhibited a paralysis but no gross pathology. Intracerebral inoculation of Swiss mice resulted in the isolation of a virus which was regularly fatal for mice. Mice given 0.1 c.c. of immune encephalomyelitis (eastern type) serum were protected against 100,000 minimal infective doses of virus of the pheasant strain. Two adult quail inoculated intracerebrally with mouse brain (pheasant strain) died in 4 and 5 days and the virus in them was demonstrated by mouse inoculations. Subcutaneous inoculation of 2 quail caused death in 5 and 10 days respectively. However, the brain of the latter subinoculated into a mouse was without effect. The virus was carried through 4 generations of very young Rhode Island red chicks. Six injected intracerebrally died in 48 hours and of 9 injected subcutaneously 7 died at varying intervals.

Losses in Massachusetts pigeon flocks were reported in the area in which horses and humans contracted the disease, but only one pigeon was presented on September 20 to Fothergill and Dingle (13) for examination. Filtered (Berkefeld V) and non-filtered pigeon brain emulsion injected intracerebrally into two lots of 4 Swiss mice caused the death of all the mice in 48 to 96 hours. The virus was identified as the eastern type since only 2 of 6 guinea pigs died that were immunized to the eastern type, whereas 2 immunized to western type virus and all six controls died. These authors also showed that pigeons were susceptible to intracerebral injections of eastern type virus of human and horse origin as well as to the strain of pigeon origin.
An outbreak beginning earlier than the two mentioned above occurred at New Monmouth, Monmouth County, New Jersey, and since the symptoms (ataxin and tremor) were suggestive of avian encephalomyelitis (epidemic tremor), material was sent to Van Roekel who was particularly interested in this disease. Van Roekel and Clark (14) have since identified the disease as equine encephalomyelitis (eastern type). Five of 6 five-day-old Rhode Island Red chicks contracted the disease following intracerebral inoculation, and thereafter 10 serial passages were made. One pheasant resisted an intracerebral inoculation of the original material, but a second succumbed to a similar inoculation of second-passage chick brain. A third pheasant inoculated with the brain of the second also died. A brain suspension of ninth serial passage in chicks was injected intracerebrally into 6 English sparrows (Passer domesticus). Symptoms developed in 16 hours and death in 19 to 24 hours. An older suspension killed only one of 5 sparrows inoculated, and its brain inoculated into 3 sparrows and 4 chicks caused death of all of them in 24 to 48 hours. However, of the 4 sparrows that resisted the above inoculation only one failed to show symptoms or die after a second dose and yet the infectious agent was demonstrated in the brain of this bird by subinoculation into day-old chicks. That the agent was the eastern type was shown by the fact that 4 guinea pigs immunized to western type virus and 4 controls died after intracerebral injection whereas only 2 of 6 died that were immunized to the eastern type. Moreover, hyperimmune horse serum (eastern type) and the serum from a recovered human case (also eastern type) neutralized the virus whereas hyperimmune serum of the western type showed only slight neutralization.

Further inquiry into this outbreak showed that 883 pheasants had been hatched in five lots between May 16, and August 6. An accurate mortality record kept until September 15, showed a total loss of 397 from all causes. Most of the losses, however, occurred soon after hatching. The first bird taken out because of "paralysis" was removed on
August 20, and this probably marks the beginning of the disease. According to the owner, the disease was most prevalent in the first four hatches and usually appeared when the birds were 6 or 7 weeks old. Very likely about 200 died of the disease.

Several neutralization tests were made (15) in the developing egg with the sera of 9 survivors and 5 of the sera neutralized from 10 to 10,000 fatal doses of virus. Nineteen other sera were tested once and 12 neutralized from 10 to 1000 fatal doses. These results demonstrate that certain birds do recover and this fact is observed on every plant.

That birds which carry neutralizing substances are immune was demonstrated by failure to infect 3 such birds by an intracerebral inoculation of 0.5 c.c. of a virus suspension which was lethal for egg embryos in a dose of 0.1 c.c. of a 10^{-10} dilution. This dose given to a pheasant with non-neutralizing serum caused the typical disease in 2 days. Two days later this bird was killed in extremis. The blood of this bird contained no demonstrable virus by egg inoculation and even a heavy brain emulsion inoculated into 10 day old eggs caused death only after 5 days, but in two subsequent serial passages death of the embryo occurred within 24 hours. It appears then that auto-sterilization was at least beginning as observed in ducks by Remlinger and Bailly. This farm was visited November 13 this year to determine if the outbreak had been repeated. It was learned that only 16 hens and 3 cocks had been kept over as breeders. Only 51 chicks were hatched out in July and no trouble had been experienced.

1939 Outbreaks—Forked River

The first outbreak came to our attention when 2 dead pheasants were brought in from Forked River in Ocean County, New Jersey, on September 13. The disease appeared about September 1, in one of two pens each containing 500 breeders (hatched in spring of 1938). Already about 45 had died in this pen. About September 7, the disease ap-
peared in the adjoining pen and 4 or 5 had died there. The farm was visited September 25, and the two pens of breeders had been placed in 3 pens at some distance from the first. Losses continued after the moving, but 3 pens adjoining these and containing about 900 pheasants hatched at the end of June, had seemingly not contracted the disease. The farm was visited again on October 13, and it was reported that losses stopped soon after September 25. In all, about 150 birds had died. This farm had produced from twelve to fourteen thousand pheasants during the season.

A live male and 2 dead females were brought in on September 20. In these as in those of September 13, there were no autopsy changes. The symptoms reported include paralysis of the legs, head drawn over back, staggering, and failure to eat or drink. In isolated birds, death occurs in one or two days or the bird recovers slowly. However, in most cases, other birds pick the affected bird to death before isolation can be effected.

A portion of brain from each of the birds presented on September 13 was removed to a tube and frozen over night. This material was ground in 10 c.c. of broth and filtered through a Berkefeld V filter on September 14, and 0.25 c.c. of filtrate inoculated into each of 4 eleven-day-old embryonated eggs. One embryo was dead the following morning, two that afternoon and the last the next morning. The filtrate was sterile as determined by aerobic and anaerobic cultures. Likewise, cultures of the four eggs were negative at harvest.

The serosa from one of the above eggs was ground in 5 c.c. of broth on September 20, and ten-fold serial dilutions made which were inoculated in 12 day-old eggs in a dose of 0.1 c.c. All of the embryos were dead within 24 hours except the one receiving the 10^-3 dilution which was dead by the 36th hour. The highest dilution made was 10^-4. A third passage in eggs was made September 29 and on November 3 a neutralization test was made in 11-day-old eggs with a membrane of the third passage. I am indebted to Dr. Carl
Ten Broeck for supplying the immune serum (eastern type). Inoculations were made in duplicate and each egg received 0.1 c.c. of the virus dilution and 0.1 c.c. of broth or 0.1 c.c. of serum. There was no incubation of the reagents and inoculations were completed by 3:15 P. M. November 3.

The results are given in Table I:

<table>
<thead>
<tr>
<th>Mixtures</th>
<th>-4</th>
<th>-5</th>
<th>-6</th>
<th>-7</th>
<th>-8</th>
<th>-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virus and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virus and</td>
<td>D 11/4 A. M.</td>
<td>Lived</td>
<td>Lived</td>
<td>Lived</td>
<td>Lived</td>
<td>Lived</td>
</tr>
<tr>
<td>Serum</td>
<td>D 11/5 A. M.</td>
<td>Lived</td>
<td>Lived</td>
<td>Lived</td>
<td>Lived</td>
<td>D 11/7 A. M.</td>
</tr>
</tbody>
</table>

D indicates death of embryo.

From these results there can be no doubt that the eastern type immune serum neutralized the pheasant virus. There were, however, 3 irregularities in that in the virus-broth series, one egg receiving the 10⁻⁴ and one receiving the 10⁻⁵ dilution failed to die, and an egg receiving serum and the 10⁻⁹ virus dilution died. Whether this latter contained virus or not was not determined by subinoculation.

It now seems entirely possible that this farm had outbreaks of encephalomyelitis in 1938 and 1937. Thus, on September 27, 1937, three live pheasants were presented for examination. It was reported that 8-10 birds died every day, that 5 days previously the flock had been moved which seemed to cut the mortality to 1 or 2 a day. These birds had lost the use of their legs and one lost control of the head and neck. Likewise, on September 12, 1938, five pheasants were presented with the history that 500 had been moved to a new range a few days ago and that within a day or so some were found dead and others paralyzed. About 50 had been lost. Cultures were negative.

**Freehold Outbreak**

On September 18, two live pheasants were brought in from a farm near Freehold in Monmouth County, New
Jersey. Because of the characteristic symptoms encephalomyelitis was suspected and brain material was removed from each bird and frozen until September 20. On that date the brain material was emulsified in 10 c.c. of broth and passed through a Berkefeld V. The filtrate was sterile as shown later by aerobic and anaerobic cultures. Each of six 12-day-old embryonated eggs received 0.2 c.c. of filtrate in the afternoon. The next morning only one embryo was dead, but the remaining 5 were dead when candled the next morning. Cultures from each egg remained sterile. One of these eggs supplied inoculum for a second generation on September 29 in which the virus was active in the highest dilution tested, that is, $10^{-6}$. An egg in this generation that received a $10^{-5}$ dilution supplied inoculum for a neutralization test made on November 3, using the technic already described. The results are found in Table II:

<table>
<thead>
<tr>
<th>Mixture</th>
<th>Dilution of Virus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-4</td>
</tr>
<tr>
<td>Virus and</td>
<td>D 11/5 A. M. D 11/5 A. M.</td>
</tr>
<tr>
<td>Virus and</td>
<td>Lived</td>
</tr>
<tr>
<td>Serum</td>
<td>Lived</td>
</tr>
</tbody>
</table>

D indicates death of embryo.

As shown above, the virus was neutralized by an eastern type serum. Virus was demonstrated in material from the embryo that received the $10^{-6}$ dilution by reinoculation into 3 eggs which died in the usual time.

The course of events on this farm is rather interesting. The disease started in Pen 1 about September 6 and losses continued until about October 24. The disease did not begin in adjoining Pen 2 until about October 5 and was still in progress November 7. Thus the disease was confined to the one pen for a month notwithstanding the fact that the birds were separated only by a wire fence. The population of Pen 1 was about 800 drawn from 680 hatched May 25; 250 hatched June 2, and 200 hatched June 9. As each lot reached
the age of 10 weeks on the range, it was moved into this pen so that the first lot was moved in about August 3; the second about August 11; and the last lot was added about August 18. The population of Pen 2 was originally about 500 drawn from 500 hatched July 1, and 300 hatched July 6. Consequently, the first birds were put in Pen 2 about September 8 and the last about September 13. About 100 birds were added to this pen at a later date. These were from a hatch of 200 on July 13, and 50 were still in the rearing field at some distance on November 7 and had never shown a case of the disease. Thus, the birds of Pen 1 were somewhat older than those in Pen 2. Pen 1 was more crowded since it contained 800 as against 600 at the most in Pen 2. Since both pens were about the same size (150 x 170 feet) and Pen 1 was populated for a longer time the vegetation (corn, sunflowers, grass, etc.) here was cleaned up earlier and picking had started. In fact, on September 25, the vegetation was cleaned up in Pen 1 and there was still plenty in Pen 2 where picking had not started. When the vegetation in Pen 2 was scarce picking began and the disease followed. The caretaker stated that the disease progressed faster in Pen 2. The loss in each pen was not recorded but the total was estimated to be about 500. It should be recorded that losses continued even after three frosts. The club also supported 19 turkeys, about 140 ducks and about 25 chukar partridge. None of these was affected. However, when visited November 7 a loss of 12 to 14 partridge was reported. These had always been in confinement. Finally, it should be added that the caretaker is certain that the same disease existed there in 1938 and began about 2 weeks earlier. It should also be mentioned that a gapeworm infestation (Syngamus trachea) caused considerable trouble prior to the encephalomyelitis outbreak.

We were interested in determining whether the losses reported as late as November 7 were in reality due to encephalomyelitis. A bird showing paralysis and thought to have been taken out that day was obtained and its brain removed the next day when it was destroyed. Blood was also collected from the heart. A Berkefeld V filtrate of brain tissue inocu-
lated into each of 4 eleven-day-old eggs on November 10 gave negative results. A second filtration made on November 16 was also negative as were the results of 4 eggs each inoculated with 0.1 c.c. of blood serum. Apparently then this was an old case in which the virus had disappeared. That the disease may occur this late was shown by the next outbreak.

Sparta Outbreak

Three cock and 2 hen pheasants were brought in November 10 from Sparta in Sussex County, New Jersey. These birds were dead and in good flesh. The autopsy showed only slight congestion of the liver and some inflammation of the intestines. Cultures from the liver were negative. The history of the case suggested encephalomyelitis so that a portion of brain was removed from each bird. A suspension of the pooled brain tissue was filtered through a Berkefeld V candle and each of 4 eleven-day-old eggs given 0.2 c.c. that afternoon. Two of the embryos were dead the following morning and the other 2 died by evening. The embryos showed the usual hemorrhagic appearance and cultures were sterile. Two more pheasants were obtained November 14 and a Berkefeld V filtrate of pooled brain tissue inoculated into 4 ten-day-old eggs in a dose of 0.2 c.c. on November 16, resulted in death of all embryos within 24 hours. A neutralization test made at this time was not entirely satisfactory. The virus suspension consisted of a portion of brain from each bird emulsified in 5 c.c. of broth from which tenfold serial dilutions were made and only one egg inoculated with each dilution. All those receiving virus alone died except the ones getting the 10⁻¹ and 10⁻² dilutions. Those receiving the virus and immune serum (eastern type) all died except the one injected with the 10⁻² dilution. However, the only typical embryos were those receiving the 10⁻¹ and 10⁻² dilutions.

The history showed that no pheasants had been on this place before 1938, when 12 males and females were purchased from one source and all these have been well. A few
months later about 9 were purchased from another source and all but 4 died but not from a disease resembling the present one. No young stock was reared in 1938. In the spring of 1939 some eggs were hatched off the farm and some on the farm but all the chicks were reared on the premises. From 1200 eggs only 600 chicks were obtained. The loss in chicks was also heavy so that about 300 were reared. This year a pair of Golden pheasants and a Silver pheasant were purchased in June or July and have remained well. A hen had been traded with a neighbor for a cock bird. About 40 pigeons which had had access to a stable were brought to the place September 23. Finally, a bantam was added to the population. Very likely none of these additions are significant.

Field trials were held on the place on October 6-8, and for this purpose 50 or 60 pheasants were brought from the outside. The birds used October 6 were not in the owners pens before liberation, but those used October 7 and 8 were, but not more than 2 days. Of the birds taken to the field for trials October 8, three died and were buried. It was commented afterwards that at the trials the birds were poor fliers.*

The owner experienced trouble with picking before the trials but thinks the present trouble began later, that is, about October 20. However, the trouble began in the field, that is, before the birds occupied the pen or pens temporarily used to hold the birds used in the trials. The disease continued after the young stock was distributed into 5 holding pens. On November 14, a pen of 25 young cocks had had no loss for about 3 weeks. An adjoining pen containing about 35 young females, the two Goldens and one Silver had suffered the heaviest mortality and birds were still dying. Another pen had about 40 young females and was still suffering losses as was a barn containing about 65 young males and females. Finally, in a divided pen there were 8 old hens and an old cock on one side and an old cock and 13 old hens and an old cock on one side and an old cock and 13

*Information just received (Dec. 2) revealed that the pheasants used in the trials were taken from a pen of about 400 birds at Forked River on October 5.
young hens on the other. One loss occurred in the latter place about 2 weeks ago. The total loss is not known but was about 100 out of the 300 birds.

**Other Possible Outbreaks**

Two recently dead pheasants were received July 18, 1936, from Clinton, in Hunterdon County, New Jersey, with the history that they suddenly lost the use of their legs and later were unable to hold the head up. The appetite was said to be good as long as they were able to eat. Death occurred in 6 to 10 hours and, at this time, they exhibited pain. Autopsy showed some congestion of lungs, and bacteriological examination was negative.

One live and 2 dead pheasants were received from Princeton, in Mercer County, New Jersey, on September 26, 1938. The autopsy showed nothing and a bacteriological examination was negative. The history revealed that soon after the hurricane on September 21, some birds lost the use of their legs and refused to eat. About 25 had already died and an equal number was paralyzed. The estate was visited November 7 this year and it was learned that the outbreak last year lasted about one month, that is, when cold weather set in, and that the mortality was about 40. The old birds, 20 hens and 5 cocks were not affected. Pheasants have been reared on this estate since 1922, but this was the first outbreak of such a disease. It is interesting to record too that this was the first year that gapeworms were noted. Additions to the population prior to the outbreak include a cock pheasant from a game farm in Princeton in January or February, 1936. At the same time 6 pairs of quail were purchased but eventually most of them died of blackhead. On June 25, 1936, 50 chukar partridge were purchased, but these suffered no unusual mortality. The young pheasants surviving the outbreak were sold to the Washington Market in New York City.

This year the old breeders supplied eggs that were hatched between May 1 to August 1 so that 350 chicks were obtained and from these 200 had been reared. The loss was attributed
to gapeworm infestation. No encephalomyelitis appeared in 1939. The estate supports at present Chukar partridge 3 years old, quail 3 years old, several kinds of pheasants, turkeys, ducks, geese, guineas and several kinds of tropical birds.

In the course of events we learned of another game farm which undoubtedly suffered losses from encephalomyelitis. This farm is near Cream Ridge, in Monmouth County, New Jersey, and pheasants have been reared here for years. At the beginning of the past season there were 123 cocks and 110 hens. Twenty cocks had been exchanged about March 17 with the farm near Freehold already described. Hatching began the last part of May and continued until the first part of July, a hatch being taken off every 10 days. About 2000 chicks were hatched. During the rearing period losses from gapeworms were experienced. Near the end of August the young stock was put in holding pens adjoining the pen of breeders. Corn and sunflowers grew in the pens and when this was cleaned up near the end of September, the disease began. The symptoms were typical, some birds showed paralysis, some walked in circles, etc. The caretaker claims that only 40 or 50 died and that many recovered if removed to prevent attacks. The disease affected both young and old breeders and stopped with the appearance of cold weather. The caretaker had been on the place 3 years and had not seen such a disease before. He was acquainted with the outbreak at Freehold which he thought started earlier. The caretaker at Freehold, in turn, was acquainted with the outbreak at Cream Ridge on September 25 so that it must have started earlier than this date.

Remarks

The definite diagnosis of 3 natural outbreaks of "equine" encephalomyelitis in pheasants this year and the possible occurrence of a fourth outbreak indicate that the disease is not uncommon in this species. Diagnosis is easily made by the inoculation of embryonated eggs with brain filtrates. Similarly, neutralization tests may be made in eggs.
The limited number of outbreaks seems to indicate that the disease in pheasants is most common in those counties (Monmouth, Ocean and possibly Mercer) where it is also common in horses. However, one outbreak (Sussex) is out of the endemic area.

The time of appearance of the disease seems to parallel that in horses. On the basis of Dr. Hendershott's report (16), however, the first outbreak in New Jersey involved a horse seen by Dr. Higgins on August 2, whereas the first pheasant outbreak began about September 1. This may not be significant since the dates concern only those cases definitely diagnosed. Sometimes the disease in pheasants disappears after a frost but this was not the case on two farms.

The disease seems to have been enzootic on two farms, in one case losses occurring the previous year and in the other on two previous years. This does not necessarily indicate that the pheasant is a carrier, in fact, very limited egg inoculations made with material from survivors have given only negative results. An outbreak of the disease does not necessarily become enzootic (New Monmouth).

Age seems not to be a factor in the natural outbreaks. At Forked River only the breeders died, at Freehold this year's crop was affected and at Sparta and at Cream Ridge (if it were the disease) both young and old died.

If the mosquito is the only transmitting agent it is difficult to explain the existence of the disease for about one month in only one of 2 adjoining pens at Freehold. The slight difference in the age of the birds would hardly explain this since age seems not to be an important factor in natural outbreaks. It is also to be noted that 50 birds (July 13 hatch) left in the field had not contracted the disease (November 7) whereas the others of this hatch placed in Pen 2 contracted the disease. And yet, very close to the field birds, there were 2 cages of affected birds isolated from Pens 1 and 2.

On two plants (Freehold and Sparta) the disappearance of vegetation in the holding pens was followed by picking
and cannibalism and this in turn by the disease. This was also the case at Cream Ridge if that were the disease. If an affected bird is not immediately removed it is picked to death by its mates. Whether a bird in the initial stages of the disease could transmit it by picking would probably depend on the presence of virus in the nasal mucus. Unfortunately, we have not examined nasal mucus for virus. And, whether an infected victim of picking could serve as a source of infection for its attackers would seem to depend on the presence of virus in the peripheral circulation. We have examined the blood and brains of the same bird in only one case and in that the blood contained no virus demonstrable by egg inoculation.

Finally, the gapeworm infestation that preceded the outbreak at Freehold and the very probable outbreaks at Cream Ridge and Princeton should not be entirely ignored. It is to be acknowledged, however, that insofar as this area is concerned the incidence of gapeworms is much higher in pheasants than in chickens or turkeys. But since Shope (17) has pointed out the relationship between swine influenza virus, the lung worm and its intermediate host the earthworm, a similar investigation with regard to the gapeworm and encephalomyelitis might be justified. Although the gapeworm is transmitted directly, it frequently utilizes the earthworm and the latter may carry gapeworm larvae for more than 3 years. Moreover, the gapeworm may infest certain free-flying birds. But against this speculation is the fact that the virus types seem to be confined to their usual geographic distribution.

Thanks are due Mr. C. B. Hudson for technical assistance.

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PRESIDENT AXBY: Thank you, Dr. Beaudette. You know, it is mighty fine to have a man consent to be on your program when you have the assurance that he will do a good job, and here today Dr. Beaudette has been on the program, and has done a wonderful job.

The next item on the program is, "The Control of Poultry Diseases by the Veterinarian: A Challenging Situation," by Cliff D. Carpenter, pathologist, Educational Department, Allied Mills, Inc., Fort Wayne, Indiana.

THE CONTROL OF POULTRY DISEASES BY THE VETERINARIAN: A CHALLENGING SITUATION

By CLIFF D. CARPENTER, Pathologist, Educational Department, Allied Mills, Inc., Fort Wayne, Indiana.

Avian pathology is a new science. At the turn of the present century, the field of veterinary medicine embraced the diseases of horses, cattle, sheep and hogs, but most practitioners limited their attention to horses and mules. I well remember that my father called the local veterinarian to attend a sick horse, but a case of bovine dystocia caused him to drive eight miles to get the services of a blacksmith who was considered a specialist in what we would call today bovine pathology. The diseases of dogs, cats and feathered fowls received almost no attention by the practitioner and but little by scientists.
In a generation all this has changed. We have witnessed and experienced, perhaps, in veterinary medicine the greatest transition in the application of science by practitioners, of any profession in the country. The diseases of dogs and cats claim the interest of the specialist comparable to human pathology; sheep, goats, rabbits, yes, even zoo animals, have attracted veterinary attention and mortality rates in these animals have dropped in a corresponding fashion; chickens and turkeys are receiving attention undreamed of twenty years ago. Because, however, equine and bovine pathology is an older science than avian pathology, the latter has not seemed important to the average general practitioner. Should this be the case? To those veterinarians who have spent years in avian pathology, there can be but one answer—"No!" Chickens are kept in commercial quantities by more than five and a half million general farmers, and in large quantities, almost to the exclusion of all other animals, by perhaps fifty thousand commercial poultrymen. While the value of a chicken or turkey does not compare with that of a horse, cow or pig, yet fifty to one hundred chickens, which is the average farm flock, may be of more value than individual large animals on the farm.

When a farmer calls a veterinarian to attend an animal, we do not question his right to expect proper veterinary service. Should not the same feeling and relationship exist when the farmer is faced with a poultry problem?

Except in isolated cases, where the veterinarian, either by training or experience, or both, has filled this need, the general farmer looks to the feed salesman, the hatcheryman or the itinerant peddler for aid in combatting chicken and turkey diseases. It is felt by many that this situation is changing, but can be changed at a faster pace than we are witnessing today. Accomplishing this requires a lot of thought and directed help from several sources. In addition, there must be a definite desire on the part of the general practitioner to serve the needs of the flock owner in a manner comparable to that in which he today serves the farmer in other veterinary fields.
Eggs and poultry meat have held second place to dairy products in this country during five of the last six years; during this time they provided a greater income to the farmer than the total grain crop of this country.

Undoubtedly the poultry industry became of age when the setting hen lost her job as the incubator and brooder of the farm flock. With the introduction of mammoth machines, some of which incubate fifty thousand eggs in a single unit, there became established a new industry, namely, the business of hatching fertile eggs to supply the farmer with his annual brood of baby chicks. Because the hatcheryman requires certain supervision of farm flocks supplying him with hatching eggs, his relation with these poultrymen is closer than that of the veterinarian, and probably always will be. In somewhat similar manner, if the farmer raising his annual brood of chicks has a disease problem during the brooding period, it is quite natural for him to turn to his hatcheryman first, because he may believe that his chicks are not thriving as a result of poor quality, or, more logically, because he feels that the hatcheryman can assist him materially in feeding and management, and thus the veterinarian is many times overlooked.

But more serious to our profession than being overlooked, is to have the local veterinarian called and either attempt to dismiss the problem by remarking that the chicks were doubtless of poor quality, or, there is something wrong with the feed the farmer is using, or else prescribe some medicine for the poultryman and, with a professional wave of the hand, dismiss the case at the moment by saying, "I'll see these chicks again next Thursday."

Yes, avian pathology is a new science. Many valuable known facts of poultry disease control are in the hands of a small coterie of scientists, practicing veterinarians, extension workers, some hatcherymen and feed dealers, and a smaller number of poultrymen. It is safe to say that six to eight thousand veterinarians in this country today either are not doing any poultry practice, or are prescribing for poultry
diseases in an inadequate fashion. Let it be understood that this situation is evident, particularly in the area from Ohio to the Rocky Mountains. This region includes several million farm flocks with a poultry population of about two and one-half million chickens. Because of more specialized poultry farming in the New England states, some of the Coast Atlantic states, and the Far West, the average general practitioner in these areas, either has no poultry practice or else employs modern methods and dispenses to his poultry clients standard products of recognized value.

This has but one natural consequence. The poultry farmer by nature is no more medicine minded than is the cattle owner. He reads his poultry information many times from questionable authors and concludes that he will buy a bottle of medicine from the nearest dealer for a given situation. If, after employing such medication, he loses but two to twenty per cent of his flock or brood, he feels that the "remedy" saved the balance of his birds. Such a farmer would follow the same procedure in treating cows if he dared, but calls in the veterinarian because of the higher value of the individual, and further, he expects him to know more about bovine diseases than does he.

The commercial poultryman intelligently utilizes fowl pox and laryngotracheitis vaccines, disinfectants, certain control agents for external and internal parasites, pullorum antigen and tuberculin. From experience he has found mixed bacteria for colds or coryza, fowl cholera and typhoid to be of no practical value to him, so he saves his money. If prescribed by a veterinarian however, it usually is his last professional visit to that poultry farm. Avian pathologists have isolated at least two different pathogens capable of producing coryza in chickens, but thus far no valuable means have been found of employing these agents in biological preparations.

Again, the commercial poultryman does not believe in drinking water antiseptics for healthy chicks, intestinal disinfectants, so-called mycosis remedies, and valueless
coccidiosis treatments. A survey of field conditions shows however, that drugs for coccidiosis, so-called intestinal disinfectants, and mixed bacterins, are the three most commonly prescribed treatments to poultry farmers by general practitioners.

By failing to correct errors in sanitation, adequate feeding, and other needed improvements in management, the veterinarian is but lessening his influence with his poultry clients, and paving the way for the "quack" who may prescribe the same medication, but under a different label, for a smaller fee.

These comments may make interesting listening, but why, you may well ask, present this discussion before your body, composed primarily of regulatory veterinarians?

Last summer 850,000 people attended the Seventh World's Poultry Congress at Cleveland, Ohio, during a period of eleven days. One of these days was named for the American Veterinary Medical Association, and three hundred veterinarians from thirty-seven states and eleven foreign countries attended the special program that had been arranged for them. It was encouraging to find that more than half of the veterinarians who attended were general practitioners. Because of the location of the Congress, most of them came from Ohio, Pennsylvania, Indiana, Illinois and Michigan, all of which are leading poultry states. Poultry specialists came from as far as Washington and California. General practitioners deriving more than 50% of their practice from poultry came from the states of Washington, New Jersey and Indiana. Ohio, Michigan and Indiana produced veterinarians doing 25 to 50% poultry practice, and many states were represented in which poultry comprised 10 to 25% of their practices. Those in attendance felt that they had been amply rewarded for the time and expense necessary to attend. The chairman expressed the hope that such an enthusiastic response was but the beginning of a rapidly growing conviction that veterinarians should, and can do a better job for the poultry industry in these United States.
This Association of veterinarians can do much toward the growing sentiment in favor of awakening the veterinarian’s responsibility for the control of poultry diseases. In order to accomplish this, it is as essential for federal and state veterinarians to guide, advise and counsel with the practitioners within their areas on matters of poultry practice, as it is for pathologists at our state colleges and experiment stations. These laboratory workers have appeared on state and national programs for the past twenty years, bringing to veterinarians the latest information. Oft-times the poultry papers have been read near the end of the program, or, if they have happened to get a favorable spot, too many times attendance at these sessions has been small. No doubt some of these papers have failed to leave with the practitioners definite methods of applying new information, but after all, that is a problem for the practitioner, who should digest the substance of the conclusion or summary, and find a method of using it to better his poultry practice. Too often when practitioners listen to a paper on coccidiosis, for example, and hear the pathologist summarize that there is no drug or combination of drugs, effective in preventing, curing or controlling this disease, but, that it is a matter of changing litter, moving the brooder house to clean ground, adequate feeding and management, they leave the meeting feeling that this pathologist would starve to death were he in practice, because he hasn’t left the farmer any medicine.

However, with the known facts before 95 to 98% of our commercial poultrymen and perhaps 50% of our farm flock owners, that drugs have no place in combatting coccidiosis, the veterinarian suffers a poor comparison to the feed salesman or hatchery service man who adequately serves the farmer’s needs.

The veterinary profession at the moment stands at a critical point in the eyes of the poultry industry. There is before us a choice of two roads to take. On the one hand, the general practitioner can continue as he has in the past, doing but little about poultry diseases in his community, and looking askance at anyone who does, or, proceed along the
more professional avenue of putting our own house in order, command the intelligent respect of the leaders of the poultry industry, and, at the same time, enhance his fees by so doing. If we accept the full responsibility of guarding the health of farm animals, then there is but one choice, and to accomplish our purpose, we can begin by:

1. Better preparing our veterinary students for poultry practice.

2. Working more closely with avian pathologists, and applying to the practice of veterinary medicine the results of their researches which have been accomplished by their sincere efforts to help both the practitioner and the poultry industry.

3. Furthering a more intimate working relationship between federal, state and county veterinarians with practitioners, concerning poultry problems, and, may I add, no hesitancy to discuss routine methods of poultry disease control with practitioners.

4. Fostering a desire on the part of general practitioners to enlarge their practices to include poultry diseases, in case they are not already so doing, and assist these men to improve their recommendations where needed. Extension veterinarians now working with poultry diseases are doing an excellent job of assisting practitioners within their states. Too often, however, the extension veterinarian is not looked upon by the general practitioner as an aid to his poultry problems, but there is considerable evidence that this situation is changing for the better.

In one state the poultry specialist has held extension classes for practitioners only to discuss poultry problems. Some men have driven many miles to attend these meetings, and all agree that these classes have been of tremendous benefit. Since avian pathology was of little consequence in college curricula prior to 1930, and almost unheard of prior to 1920, it is evident that graduates prior to ten and twenty years ago benefit materially from extension classes such as these. It is sincerely hoped that this idea will spread to other states, since the need for it is greatest where such immediate help seems remotest.

5. Stressing the importance of reading poultry articles in veterinary journals and in Poultry Science. Noteworthy mention should be made of the increased amount of space being given today by veterinary publications to problems of poultry practice—and we should have more.
These five points suggest a tangible beginning. Obviously this association can offer additional ways and means for making this program more effective.

There is a phase of possible assistance to the general practitioner which has received but little attention—that of poultry articles and advertising of poultry products in the publications of pharmaceutical and biological houses. Their advertising and articles on diseases of animals other than poultry have kept well in step with the progress of scientific research, yet the sections devoted to poultry have been changed correspondingly little during the past decade. The practitioner who depends upon information of this nature and employs the attending products finds himself at once at variance with the work of most pathologists at state colleges and experiment stations.

Many practitioners criticize the layman who mixes some drugs and sells them as a commodity on the poultry market, while at the same time he himself follows this exact procedure, and is at a loss to understand why he is not doing more poultry practice. On the one hand it is considered quackery, on the other, professional.

In addition to extending encouragement to practitioners to improve their knowledge of poultry disease control, we should devise methods of assisting them to understand better the relationship of breeding and feeding to diseases and disease resistance. In the presence of a given disease with the possible exception of laryngotracheitis, which strikes suddenly, more birds, including chicks, pullets and layers, starve to death than die from the pathogen itself. This embraces diseases such as pullorum, coccidiosis, fowl pox and fowl paralysis. It is as essential to the veterinarian that he be familiar with feeding practices, and the vitamin content and ingredient quality of poultry feeds, as it is that he understand germs, viruses and parasites. Malnutrition still exists as one of the greatest factors in interrupted egg production, failure of pullets to develop properly, and chick mortality. Inadequate feeding, lack of feeding space and
improper housing are tremendous factors in curtailing the profits of the poultryman, and, tritely enough, medicine cannot correct these failures of husbandry.

The Poultry Disease Committee of the A. V. M. A. has on its membership this year for the first time, two practitioners. Its personnel includes federal and state pathologists, and an extension specialist, in addition to practitioners. The number has been enlarged from five to seven, and at the Washington meeting they will make definite recommendations which, it is hoped, will meet with a favorable response from the veterinary colleges, regulatory veterinarians, research workers and general practitioners, thereby assisting our profession in furthering poultry practice.

Meeting the challenge of controlling poultry disease by the veterinary profession cannot be treated lightly, else within the next decade we shall witness less and less requests for professional service in the control of poultry diseases by the industry, and more and more of what we today call "quackery." The World's Poultry Congress this year demonstrated the ability of this billion dollar industry to organize for a common purpose. They sought veterinary participation at every opportunity. We responded with everything we had, and I am certain that the veterinary profession today stands high with the fraternity of poultry leaders. As a profession, do we deserve this high esteem, and how much are we willing to do to insure its continuance and justify this faith? In the final analysis, the veterinarian must be charged with the responsibility of poultry disease control, but we can only fulfill our obligation by the same intelligent application of our scientific knowledge of pathology and husbandry that we have applied so successfully to the diseases of other farm animals.

PRESIDENT AXBY: That was a most interesting literary production, and we thank you, Dr. Carpenter.

The next paper is titled, "Turkey-Disease Control in Commercial Flocks," by L. D. Frederick, chief veterinarian, Swift and Company, Chicago, Illinois.
TURKEY DISEASE CONTROL IN COMMERCIAL FLOCKS

By L. D. Frederick, D. V. M.,
Swift and Company

During the past few years and particularly the last two, the raising of turkeys on a commercial scale has become commonplace in most sections of the country. Many beginners have entered the field during this period with varying degrees of success from a disease control standpoint. The ones who made a careful study of scientific disease control methods and then diligently applied them were usually the successful individuals.

The commercial flock is liable to the same disease hazards as the small farm flock, with the chances for death loss multiplied many fold due to the increase in numbers involved and the possibility of stepped-up virulence of disease outbreaks. In consideration of these facts, the large producer must equip himself and operate according to proven methods of disease prevention and control.

For the purpose of discussion, let us divide the operation of raising turkeys into four sections: 1. The selection of breeding stock; 2. Incubation; 3. Brooding; and 4. Ranging.

1. The production of eggs from strong, vigorous, disease-free breeding stock of the desired type which has been maintained on a complete, balanced diet is very essential. The breeding stock should be B. W. D. Tested and culled for any transmissible, undesirable physical characteristic, or malformation known to be hereditary. The reason for these requirements is obvious in preventing disease and physical defects in the progeny.

2. Proper incubating equipment and methods of operation are of primary importance. Without proper temperature and humidity control at all times during the various stages of embryo development, poor hatches, weak birds and predisposition to infection later are inevitable. Improper incubator sanitation, including fumigation, is chargeable with numerous disease outbreaks. Many have found it imperative to prohibit visitors to the incubating and hatching house because of the possibility of their carrying disease producing micro-organisms on clothing. The strictest sanitation should be maintained in these quarters.
3. The time of year poults are hatched and the section of the country in which the operation is carried on will determine how long they should be kept in the brooder house. The poults while under these necessary, confining, brooding conditions may develop primary and predisposing causes of disease. The brooder house should contain equipment that is efficient and easily cleaned. Temperature under the hovers of the brooder stoves must be regulated to fit the need of the poults at their various stages of development so that they are not allowed to chill or on the other hand become overheated. These two extremes are responsible for heavy death losses and should be guarded against. Room temperature and ventilation must be carefully controlled as drastic variations may prove disastrous. Considerable death loss is occasionally experienced from baby poults refusing to start eating. Numerous tricks may be applied here. A few of the more common ones are: (1) Place mash feed on a paper plate and stir it with a bright, shiny object to attract the birds' attention; (2) Place vari-colored marbles in the feed receptacles; (3) Sprinkle moistened mash feed, containing finely hashed green feed and boiled eggs, into paper plates from a short distance above, etc. All of these acts are designed to play upon the baby poults curiosity and entice them to begin picking and eating. Feeding birds on paper plates and other such devices should be discontinued as early as possible as this offers an excellent mode of disease transfer from excreta contaminating the feed.

Many of our most successful turkey growers brood their poults on wire floors. This is an excellent method of keeping the birds up out of their droppings and helps reduce the hazard of disease transmission from this source. Water containers and feed troughs are common disseminators of disease when they are constructed so their contents can become contaminated with dropping. The remedy for this is quite obvious but it is surprising to see the variance in opinion as to what constitutes a safe and sanitary type of feed and water dispenser.

Careful systematic daily culling of the birds, removing any weak, crippled and sick birds is very good assurance against disease outbreaks. These rejected birds should be segregated and given special care and close observation and destroyed if positive evidence of any transmissible disease is detected.
Visitors should not be allowed to enter brooding pens. Workmen should not wear the clothing and shoes worn in caring for the poults on any other work. Around other poultry account the possibility of their carrying disease producing micro-organisms into the brooder house. Some growers find it worth while to require all entering the brooder house to disinfect their shoes on a suitable disinfecting pad placed on the floor at the entrance.

4. Poults may be moved to the range in the Spring as soon as they are well feathered out and the weather has become settled to the point where the danger of severe storms has passed. Range shelters, feeders, waterers, and all other equipment should be thoroughly cleaned and disinfected and set on clean ground which has not been used for other poultry for at least two years previously. Ground contaminated with chicken droppings is especially dangerous and must not be used. Birds should be fenced in and allowed only a given area. This is to keep surrounding range clean for future use. The range ground should be changed every five to seven days when birds are healthy and no disease is in evidence. The shelters, feeders, etc., should be scraped free of all droppings and disinfected while on the old location. Strict sanitary precautions and steps to prevent infection from being carried into the flock must be taken out on the range the same as in the brooder house.

Nutrition of turkeys, as of all other animals, plays one of the major rolls in disease control. Without a complete, balanced ration, resistance to infective micro-organisms is lowered to say nothing of the numerous vitamin and mineral deficiency diseases which may develop. The feeding of a high quality, balanced ration is good assurance against death loss and stunting due to disease.

The time allotted will not permit a full discussion of each important turkey disease. I will conclude with some specific suggestions for the treatment of turkeys with a view of preventing or aborting a few of their more serious diseases.

Enterohepatitis is ordinarily considered the cause of the greatest death loss in turkeys and must be guarded against constantly. Outbreaks are encountered from the time poults are two weeks old but are most common at eight to twelve
weeks of age. The prevention of this disease may be accomplished by keeping the poults in non-contaminated surroundings and through strict sanitary police measures to prevent carrying in to the flock the causative micro parasite, Histomonas Meleagris. Numerous chemical parasiticides have been investigated by us but none have been found entirely satisfactory. Phenylmercuric nitrate given in the drinking water in a dilution of 1:50,000 has given the most promise, when supplied to the birds every third day as their only source of drinking water. On extensive tests, the use of this chemical together with strict sanitation has proven quite successful.

When Enterohepatitis breaks out in a brooder house where poults are brooded on litter, it is necessary to change the litter daily, constantly cull the affected birds out and practice the best possible sanitation to eliminate the infestation. Outbreaks can be controlled on the range by moving the poults frequently onto clean ground away from the contaminated ground. A close rejecting and removal from the flock of infested birds must also be carried on to control outbreaks.

Coccidiosis, caused by another of the family of micro-parasites, is responsible for heavy losses at times. This disease may be prevented by proper sanitary precautions. The brooding of poults on wire floors is a big step forward in preventing these enteric micro-parasitic types of infestation. Our best results in treating Coccidiosis outbreaks, both in brooder and range poults, has been from the use of various forms of milk in mash feeds. When an outbreak shows considerable virulence, we put the poults on a dry mash feed containing 40% dried skimmed or buttermilk for a five-day period. If, at the end of that time, the symptoms of the disease have not entirely cleared up they are left on treatment another two days. This may appear to be rather heroic treatment but it has not failed to produce satisfactory results in our hands. In the brooder house outbreaks, if the poults are being brooded on litter, the litter should be changed daily, the floor underneath deodorized and disin-
fected with a suitable spray, and all other applicable sanitary measures used. On the range the poults may be moved to clean ground daily and good sanitation generally maintained. Close rejection of suspicious birds from the flock must be diligently followed.

Trichomoniasis, another of the micro-parasitic, protozoan types of disease, is apparently becoming more widespread year by year. The same preventive and control measures, as we have outlined for Infectious Enteritis, have given good results in our experience.

Sinusitis (simple-non contagious) unless properly treated can cause considerable economic loss. In our investigation of this disease, we have found nearly all outbreaks in flocks where the mishandling of ventilation and temperatures had taken place in the brooder house. Outbreaks have also occurred in poults that were not properly protected from cold wet weather when taken to the range. These conditions appear to start as simple colds and gradually progress to the exaggerated sinusitis, with not uncommon, pyogenic invasion.

Two methods of treatment have produced satisfactory results for us. The first method consists of irrigating the affected sinuses with a mild sodium bicarbonate solution by use of a special syringe which removes the usual large collection of mucous exudate. Then an ephidrinated inhalent (Lilly's No. 20) is injected direct into the sinus with a small hypodermic syringe equipped with a twenty gauge, half inch needle. About two drops are injected and the sinus wall is massaged to distribute the medicament to all internal surfaces. The treatment is repeated at two-day intervals. Usually two to four treatments are sufficient.

The second method consists of irrigating the sinus by the same means as in the first method. Then by means of a glass hypodermic syringe equipped with a sixteen gauge, half inch needle, two drops of a five per cent Silver Nitrate
solution is injected. The affected sinus wall is managed so that all surfaces are contacted by the medicament. Considerable care should be exercised in making the injection so that an excess of this highly irritating medicament is not deposited in the sinus with the result that it later runs down into the bird's throat with occasional damaging results. One to three treatments by this latter method are usually sufficient to effect a return to normal.

We have no new developments to report on the prevention and control of numerous other turkey diseases such as Paratyphosis, Fowl Cholera and Typhoid, Botulism, etc. Standard recognized methods of control are used by us and consist mainly of stringent sanitary police measures. We have obtained fairly good results from vaccination in outbreaks of Fowl Cholera-Typhoid, but have never neglected our time proven method of sanitation and isolation of the visibly affected individuals.

PRESIDENT AXBY: It was very nice of you, Dr. Frederick, to broaden our scope of information by presenting some information on turkey disease control.

Now, my friends, we are finished with the written program, but I have just had handed to me some committee reports and if you will bear with me I have a rather lengthy one here, and it appears that I am going to have to read this. It is the report of the Committee on Transmissible Diseases of Poultry. Is there any objection to my reading that now, or do you want to pass it over?

VOICE: I make a motion that we hold that until there are more present.

PRESIDENT AXBY: We will take it by consent, then. If there is no other business to be presented, we will stand adjourned until nine o'clock tomorrow morning.

The meeting adjourned at 4:50 p.m.
FRIDAY MORNING SESSION, DECEMBER 8, 1939

Swine Session

The meeting convened at 9:30 a. m., President Axby presiding.

PRESIDENT AXBY: The Association will be in order. This morning's session is the Swine Session, and we will follow the printed program for fear that it may disrupt the intentions of some persons who have been following it.

First on the program is the report of the Committee on Transmissible Diseases of Swine by Dr. C. N. McBryde, chairman of the Bureau of Animal Industry, United States Department of Agriculture, Ames, Iowa.

DR. C. N. McBRYDE: Mr. President, members of the Live Stock Sanitary Association:

REPORT OF COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE

DR. C. N. McBRYDE, Chairman, Ames, Iowa

DR. T. W. MUNCE, Sioux City, Iowa

DR. V. F. SAYLOR, Zionsville, Indiana

DR. H. C. H. KERNKAMP, St. Paul, Minnesota

DR. H. M. O'REAR, Washington, D. C.

With a view to obtaining authentic data on the prevalence of swine diseases throughout the country, questionnaires were sent to Bureau field men of the Division of Tick Eradication and Special Diseases in fifteen states. The states selected included the leading hog-raising states of the Middle West and those of the South Atlantic and Southern states, which are next in importance. The following general summary is based on replies to these questionnaires.

Hog cholera still takes precedence as the most important transmissible disease of swine and a somewhat higher incidence is reported for this year, as compared with last year. No widespread outbreaks or epizootics were reported, however, and the spread of the disease from foci of infection
was well controlled by serum-virus immunization of surrounding herds.

The enteric diseases are next in importance, as they have been for many years past, and a majority of the Midwestern states report an increased incidence over last year. There can be no question that the control or prevention of this group of diseases is a matter of outstanding importance in connection with the raising of swine.

Swine flu has been less prevalent this year, on the whole. This is no doubt due to the remarkably dry and open fall that has prevailed throughout the Middle West, for this is a seasonal disease and its prevalence varies with weather conditions. Furthermore, the farmers of the Middle West are now well acquainted with this disease and are taking better care of their swine during the fall and winter months.

Swine erysipelas is reported as on the increase in four Midwestern and three Southern states. Because of the brief immunity conferred by the serum, a method of immunization that will confer a more stable or lasting immunity is greatly to be desired. It is hoped that circumstances will warrant the early publication of information concerning the cooperative experimental field project now being carried out by the United States Bureau of Animal Industry and the University of Nebraska and Nebraska State officials on the use of swine erysipelas organisms in conjunction with anti-swine-erysipelas serum.

Brucella infection in swine has been reported on the increase in several Midwestern states, but this may be due to a more general recognition of the disease through the application of more extensive laboratory tests.

It would appear that the "McLean County System of Swine Sanitation" is gaining very little headway in the Middle West. This is unfortunate, but it is a source of satisfaction to learn that this generally approved plan has been gaining headway in two Southern states, Georgia and Alabama, which are the leading swine-producing states of that region.
Regarding so-called "Community or Auction Sales," Bureau correspondents have reported that state officials, quite generally, are making earnest efforts to bring about a more efficient supervision and regulation of these sales. It is hoped that such efforts may in time eliminate or materially reduce the inherent dangers of disease dissemination through these popular sales agencies, which are considered by many to be a menace to the live stock industry.

Information was sought in regard to the practice of prophylactic immunization against hog cholera—the extent to which it is practiced and whether it is being more widely employed. The replies indicate that the serum-virus method of immunization is being more and more widely practiced. The percentage of swine protected by this method is given as 40% to 75% for four Midwestern states and as 35% and 40% for two of the Southern states.

At the risk of repetition, your committee offers the following recommendations:

1. That all appropriate agencies, such as State Agricultural Colleges and their Extension Services, all state and federal agencies dealing with live stock, and veterinary organizations generally should seek to promote the dissemination among farmers and swine breeders of a better knowledge in regard to the housing, feeding and sanitary care of swine. Printed circulars should be available for general distribution setting forth the advantages of the "McLean County System of Swine Sanitation" and better methods of feeding and housing swine. The dissemination of such information would undoubtedly accomplish a material reduction in the pulmonary, parasitic and enteric diseases of swine and this, in turn, would undoubtedly effect a marked lessening of post-vaccination troubles.

2. Continued effort should be made by state officials to effect further improvement in the regulation and proper supervision of "Community or Auction Sales," which have undoubtedly been a potent factor in the dissemination of swine diseases. It would seem that a definite start has been made in this direction and that more can be accomplished through persistent effort. The payment of veterinary service by sales agencies through a fee system should receive careful consideration. In the opinion of many persons others think that veterinarians who perform this work should be paid for this service by the state.
3. More drastic regulation of interstate and intrastate shipments of breeding feeder and stocker hogs is badly needed. The practice of sending sick or exposed hogs to auction or to community sales should be prohibited. This is a matter of very great importance in the control of transmissible disease of swine.

4. More general efforts to detect swine erysipelas and Brucellosis in swine herds with a view to limiting the further spread of these diseases is also desirable.

DR. McBRYDE: Mr. President, I move that this report be referred to the Executive Committee.

PRESIDENT AXBY: This report has already been referred to the Executive Committee, as most of you, I think, know. We have had some difficulty in that respect, so the arrangements were made, and we collected the reports that had not been read here, and to save a meeting of the Executive Committee just before adjournment the reports were all read last night. I have checked them here a second time and find that they were. Therefore, this report has been accounted for and has been approved by the Executive Committee. Personally, I want to thank Dr. McBryde. I found him to be very cooperative; and I have been very proud to have been associated with him.

Dr. Jacobs just informed me that it will be impossible for him to be here at 1:30 p.m., and if there are no objections from the floor, we will have him give his report of the “Committee on Association Publication.”

DR. JACOBS: I am very sorry to break into the regular program, but I am not going to retard it more than two or three minutes.

REPORT OF COMMITTEE ON ASSOCIATION PUBLICATION

DR. M. JACOB, Chairman, Knoxville, Tennessee
DR. D. M. CAMPBELL, DR. H. A. SEIDELL,
Chicago, Illinois Des Moines, Iowa

During the annual meeting of the United States Live Stock Sanitary Association held in 1938, the following resolution was submitted and unanimously passed:

"WHEREAS, Live Stock Sanitary officials, veterinary practitioners, live stock owners, public health workers, and others
interested in animal-disease control measures do not have available any recognized, regularly issued publication, which can be relied upon to furnish up-to-date information on regulatory measures; and

"WHEREAS, the United States Live Stock Sanitary Association should be the source of information on all matters pertaining to live stock sanitary control measures, including those pertaining to food hygiene;

"THEREFORE, BE IT RESOLVED, That the President of this Association be instructed to appoint a committee of three (3) to study the possibilities of this Association issuing such a publication at least twice each year, and that the committee be requested to report their findings and recommendations during the next annual meeting."

This committee was subsequently appointed by President Axby and it is the committee's report which I wish to submit at this time for your consideration.

The need for a representative publication as a source of dependable guidance on regulatory and related problems is obvious. The fact too, that the original resolution commanded the unanimous approval of this Association is further evidence of a desire that a definite effort be made to initiate a movement of this kind.

In studying the problem and attempting to offer specific recommendation, the committee was immediately confronted with the very limited budget, which would be available in case a more comprehensive publication were to be suggested. Nevertheless, there are some possibilities which may serve as a beginning and ultimately lead to a plan whereby an acceptable publication may be issued at regular, possibly monthly, intervals throughout the year. Accepting this as an ultimate objective, but in order to get a movement under-way, the committee recommends the following:

1. Compiling and publishing veterinary vital statistics, the procedure to be about as follows:

On appropriate blanks furnished by the United States Live Stock Sanitary Association, the directing live stock sanitary official of each state would be expected to send to the Secretary of this Association a monthly report revealing the animal-
health status in his state during the preceding month. The report should show the number and kind of disease outbreaks; the number and kind of animals affected; the mortality rate and, if possible, an estimate of at least an approximate monetary loss. If the plan is properly organized, these monthly reports would be compiled by the Secretary and the results of the compilation submitted to approved veterinary journals for publication. The plan would not succeed without full cooperation of the directing, state live stock sanitary official.

Furthermore, it is fully recognized that the information gathered in this manner may not be complete in every instance, but if the plan is officially adopted there is no doubt in the minds of your committee but that the report will gradually become more accurate and serve a useful purpose.

2. It is recommended that this Association issue a brief publication twice each year, one during the month of January and the other during July. The exact size of such a publication would have to be determined on the basis of cost and the ability of the Association to provide the necessary budget.

The publication should be a source of information on changes in inspection requirements for interstate movements of live stock, food hygiene, new factors in animal-disease control, and such other information which may be of interest and guidance not only to regulatory officials, but to all others who are directly or indirectly concerned.

The Secretary of this Association should be responsible and serve as editor of the publication.

PRESIDENT AXBY: This Committee report has been approved by the Executive Committee.

The next paper on the program this morning is titled, "Infectious Types of Swine Enteritis," by L. P. Doyle, associate pathologist, Department of Veterinary Science, Purdue University. The discussion will be led by L. H. Swartz, associate professor of Veterinary Research, Iowa State College.

It is indeed a pleasure for me to present to you Dr. Doyle with whom I have been associated for many, many years. I want you to know that we in Indiana appreciate the ability and integrity of Dr. Doyle. Dr. Doyle.
INFECTIOUS TYPES OF SWINE ENTERITIS

L. P. DOYLE, Department of Veterinary Science
Purdue University, Lafayette, Indiana.

The economic importance of the infectious diseases which affect the intestinal tract of swine is quite obvious to all who are concerned with disease control in this important class of live stock. During the past there has been considerable variation in the views held regarding the specific nature of these diseases. The fact that hog cholera may affect the intestinal tract is perhaps responsible for a large part of the confusion that exists regarding the nature of enteritis in swine. The difficulty of recognizing hog cholera by means of ordinary diagnostic methods has caused experienced observers to pause in attributing serious outbreaks of enteritis to causes other than cholera. Many successful practicing veterinarians, as well as seasoned laboratory workers, are inclined to give hog cholera serious consideration in attempting to account for enteritis in swine.

It is now obvious, of course, that hog cholera is not the only disease which may cause serious losses to the swine industry. However, the differentiation between the effect of hog cholera on the intestinal tract and other forms of infectious enteritis is by no means an easy task in all cases. During the past, various terms have been applied to the diseased conditions found in the intestinal tract of swine. For the most part these terms have been rather accurately descriptive of the pathologic changes, but they have been more or less misleading as to the primary cause of the intestinal lesions found. For example, the term “necrotic enteritis” has been quite widely used; and to some observers has come to mean a rather definite disease entity. It now appears advisable to regard necrosis of intestinal tissue as the possible effect of any one of several different causes. Likewise, the term “mixed infection” has been considered as at least a convenient expression. In view of the fact that many specific infectious diseases may become complex infections during late stages, suggests caution in the use of the
term mixed infection in any definite sense. As knowledge of the precise nature of swine diseases increases, there will probably be less need for using unsatisfactory terms such as the ones mentioned above.

At the present time it is doubtful if any experienced person would have the temerity to attempt to outline a precise method for clearly differentiating between the diseases that cause enteritis in swine. Therefore, no attempt will be made here at exact classification. Rather, an attempt will be made to discuss the conditions found so as to try to improve methods of control. When we come to consider the specific infections which cause enteritis in swine we naturally think of coccidiosis. This is a disease which is correctly regarded as an important cause of enteritis in the young of other species of livestock, more particularly in chickens. The disease has been reported, and doubtless with sufficient evidence in some instances, as an important form of enteritis in young swine.

At the Indiana Agricultural Experiment Station, we have encountered very few, if any, important outbreaks of enteritis in swine which could be attributed definitely to coccidial infection. We have, however, encountered numerous outbreaks of severe enteritis or colitis in hogs which were clinically strikingly similar to coccidiosis in other species, yet failed to show significant numbers of coccidia in the bowel discharge or in the wall of the affected intestine. From personal observation we are not able to add anything to what is written in textbooks or other publications regarding coccidiosis. Its importance in hogs seems to be much less than what would be suggested by its destructiveness in some other species.

Enteritis in swine attributed to members of the paratyphoid or Salmonella group of bacteria has received considerable attention during the past several years. A great many investigators and groups of investigators have repeatedly shown that it is possible to cause enteritis experimentally in swine by feeding cultures of Salmonella suipes-
tifer. It is also rather easy to show that even killed cultures of this micro-organism possess toxic properties for swine. Moreover, naturally infected hogs often have easily demonstrable agglutinins for S. suipestifer in their blood serum; and pure cultures are often easily obtained from the various organs.

Although the etiologic role of S. suipestifer in enteritis may have been considered established there is still urgent need for further critical examination of evidence as to how important this organism is as a primary cause of herd outbreaks of disease. Even at this late day, it may be beneficial to remind ourselves that a group of able investigators once mistakenly regarded S. suipestifer as the specific cause of the most destructive disease of swine—hog cholera.

Experiments and observations made at the Indiana Experiment Station have caused us to entertain considerable doubt as to the primary importance of S. suipestifer in causing a self-perturating disease in hogs which are immune to cholera and free from dysentery. In some early experiments it was found that cholera blood containing S. suipestifer was nearly always fatal to rabbits when injected subcutaneously. However, when portions of the same blood were injected intravenously into cholera-immune hogs in large doses the result was usually negative. It is recognized, of course, that the intravenous injection of a culture of S. suipestifer into hogs is usually followed by marked symptoms. This latter result may be due to a factor which does not exist under field conditions. In other words, this micro-organism seems to be more pathogenic for swine when injected or fed in cultures than it is when fed or injected in blood or other tissues.

Several years ago, while studying swine dysentery, S. suipestifer was frequently isolated from the tissues of affected swine. In one series of 23 dysentery hogs, S. suipestifer was isolated from 16. Several strains of S. suipestifer were then used in feeding experiments in an effort to reproduce dysentery.
All strains tested proved capable of causing enteritis to some degree. It was also found that control pigs placed with the culture-fed pigs became infected to a limited extent. During the progress of this work, it was noted that the culture-fed pigs frequently vomited soon after being fed the culture. It was thought, therefore, that the apparent spread of infection may be resulting partially from the control animals eating the vomitus. When the culture-fed and the control animals were kept separated for several hours following the feeding of culture and then placed together in a clean pen, the spread of infection was reduced, but usually not entirely eliminated. In no case, however, did the enteritis produced by feeding *S. suipestifer* cultures show nearly as great self-perpetuating power as do hog cholera and dysentery. Moreover, typical dysentery was not caused by feeding cultures of *S. suipestifer*.

During studies made on enteritis in swine, it has been found that *Actinomyces nechrophorus* may be rather easily isolated from the diseased intestinal wall, particularly from necrotic lesions. The so-called "cork-lined" ileum, characterized by thickening and necrosis of the intestinal wall, has been found to be a fertile source of this micro-organism. Cultures of *Actinomyces nechrophorus* thus obtained possessed characteristic pathogenic properties for rabbits, but proved harmless when tested on healthy swine.

Thus far we have been considering forms of enteritis in swine which may be regarded as more or less indistinct as affections of the intestinal tract. We now come to consider a disease which is distinctive as an infection of the intestinal tract. This disease we have chosen to call swine dysentery. Farmers have applied several common names to it, such as bloody diarrhea, bloody or black scours and bloody flux. Here is a disease which has well marked ability to propagate itself, and often shows a stubborn persistence on farms to which it has been brought. Our experience with this disease in Indiana began about the year 1918, when it was observed in feeder hogs that were brought from the stockyards in South St. Paul. Later it was seen in hogs that came directly
from South Dakota, and also in some coming from stockyards in Chicago.

Dysentery may affect swine of all ages, but is usually most destructive in younger hogs. In field outbreaks, variable periods have been observed to pass between the time healthy animals were exposed and the appearance of the first observed symptoms. The shortest period observed was 7 days, while the longest was 60 days. In experimentally infected animals, the incubation period varied from 4 to 12 days. As a rule diarrheal symptoms appear on the 7th to the 9th day following the feeding of infectious material. A rise of body temperature usually precedes the onset of diarrhea. The diarrhea is characterized by the presence of mucus and blood in the bowel discharge. This symptom, no doubt, has often resulted in the disease being mistaken for coccidiosis. In severe attacks, the affected animals quickly become gaunt and show marked prostration. Although the presence of blood and mucus in the bowel discharge may be considered as a distinctive feature of the disease, mild cases doubtless occur in which there is nothing characteristic about the diarrhea. In young swine the blood usually passes from the bowel so slightly changed that it is easily recognized as blood. In older animals, the blood may be changed so as to impart a dark color to the bowel discharge, thus giving rise to the name “black scours.”

The course of dysentery may vary from 3 days to 2 weeks or longer. Surviving animals frequently become stunted and unthrifty. Remissions and exacerbations are common. The death rate has been observed to range from 40 to 60% or higher in young pigs, and from 10 to 20% in older animals. On farms where the disease is allowed to persist for a year or more, the death rate is usually about 25%.

The essential pathology of swine dysentery is that of a colitis. A gastritis is also frequently found. The small intestine usually appears normal, but marked changes are found in the cecum and colon. The sharp separation of apparently normal and markedly diseased tissue at the
Infectious types of swine enteritis

The ileocecal junction is a striking feature of this disease. The early changes in the cecal and colon mucosa consist of congestion, hemorrhage and increased mucus secretion. In this stage, the colon often contains considerable quantities of blood and mucus. Later there may be considerable sloughing of diphtheritic exudate and epithelium. Large flakes or smaller masses of this sloughed material may be found mixed with the colon content. When viewed from the serous surface, the colon wall may show diffuse reddening, but it usually shows merely small, sharply circumscribed areas which may have a sago-like appearance or they may be grayish in color. These small, roundish areas in the colon wall have been mistaken for the effect of worm parasites, particularly esophagostomes. They are in reality due to inflammatory and degenerative changes in the small diverticula which are a normal histologic feature of the colon of swine. Any form of colitis is likely to cause these circular areas to appear in the colon wall.

The post-mortem findings in the colon of individual hogs suffering from hog cholera may closely resemble what are sometimes found in dysentery. Usually a definite diagnosis can be made by considering the lesions together with the history of an outbreak.

In our opinion the specific cause of dysentery is still to be determined. As has already been mentioned, S. suipestifer frequently occurs in the tissues of hogs that have dysentery. Likewise, this same organism is frequently found in the tissues of hogs that have had hog cholera for several days. Therefore, the mere finding of S. suipestifer in the tissues may leave unanswered the question of what was primarily wrong with the animal. Thus far, the disease which we have been able to produce by feeding S. suipestifer cultures has not borne a very close resemblance to dysentery.

The causative agent of swine dysentery is present in the colon and in the bowel discharge of affected animals. It is possible to infect healthy swine, particularly young ones, by feeding small amounts of colon content or bowel discharge
from a dysentery hog. Thus far, we have not been able to reproduce it by feeding viscera other than colon, although such viscera may contain large numbers of S. supestifer.

For the control of swine dysentery, there is sore need of effective regulations on traffic in infected hogs. Since there is no dependable means of immunizing against this disease, it will be necessary to teach swine producers the importance of quarantine and isolation as means of protection against serious losses from dysentery.

The question of the relative importance of cholera as a cause of enteritis in hogs will probably continue to be debated for some time. That cholera is primarily responsible for much of the inflammatory and necrotic changes in both the small and the large intestine can hardly be doubted. There is considerable circumstantial evidence to indicate that the losses due to "pig typhoid" may be considerably reduced by early and effective immunization against hog cholera. Those rather numerous cases in which suckling pigs, two weeks or more of age, become listless, develop scours and become emaciated; and show colitis on autopsy may conceivably be primarily the effect of the hog cholera virus. Likewise, the cases of intestinal "necro" which occur approximately 30 days after vaccination may possibly be explained by assuming a failure to produce solid and lasting immunity to cholera.

By way of conclusion, it seems reasonable to say that hog cholera and dysentery are two distinct diseases which are associated with enteritis in swine; and which have shown their ability to persist as serious handicaps to the swine industry. Strangely enough, the same paratyphoid or Salmonella organism is found in both of these diseases. Coccidiosis and other protozoan infections, as well as paratyphoid infections, appear to be of less primary importance in causing enteritis in swine than they are in some other animals.

PRESIDENT AXBY: This paper is to be discussed by L. N. Schwartz.
You have heard the very excellent and interesting paper presented by Dr. Doyle. He has called to our attention the economic importance of this group of infectious diseases of swine.

Our experience with enteritis in swine attributed to specific causes may vary considerably. The complications which always result from insanitary conditions often times mask the etiologic factor and make accurate diagnosis extremely difficult.

The evidence of swine dysentery has increased greatly in the past few years. Dr. Doyle has emphasized the variations which we may encounter in the field. The incubation period experienced in field outbreaks varies greatly. The comparative long incubation period makes it possible for live stock owners to consign infected swine to various sales, thereby spreading disease in new localities. Sanitary measures and effective regulation of traffic in infected swine are at the present time the only means of controlling this disease.

Last year Dr. J. H. Rietz presented a paper on sanitation in swine diseases, which contained much valuable information. I believe that each year some time should be devoted to swine sanitation and disease control. As these problems become of greater economic importance it will be necessary to formulate definite control regulations and it will necessitate the cooperation of federal, state and local authorities to effectively enforce them.

PRESIDENT AXBY: Is there any other discussion? If not, we will proceed with the next paper on the program which is entitled, "Swine Enteritis in Veterinary Practice," by John B. Bryant, Mount Vernon, Iowa. The discussion will be led by J. S. Koen, assistant veterinarian, Hog Cholera Control, Bureau of Animal Industry, U. S. Department of Agriculture, Storm Lake, Iowa. Dr. Bryant.

SWINE ENTERITIS IN VETERINARY PRACTICE

By JOHN B. BRYANT, D. V. M., Mount Vernon, Iowa.

Introduction

Swine enteritis, as observed in my veterinary practice, is closely related to three major factors, 1st, nutrition; 2nd,
production; and 3rd, environment. These factors are of primary consideration and constitute the veterinarian's first line for approaching the problem. They are, to a large extent, visible and tangible factors which the investigating veterinarian may hold up to the view of the swine owner, and which may be controlled through the cooperation of swine owners and practicing veterinarians.

I will not discuss the bacteriology of swine enteritis. I am content to leave that to my colleagues in the fields of pathology and research. However, I wish to add that veterinary practitioners are anxiously watching every development in the pathology and therapeutics of swine enteritis.

**Nursing Sow and Baby Pig Enteritis**

Immediately following the farrow, sows are frequently fed too liberally on milk-producing feeds. The result is a slight indigestion followed by mild form of enteritis. While this may not visibly affect the dam, it does alter the milk and seriously damage the digestive tract of the nursing young. To avoid this first mishap in the pig's career, the sow should receive simple rations, gradually increased during the ten-day period following the farrow. During the first twenty-four hours, fresh water, only, is to be provided. The second twenty-four hours, start with light feeds of oats and bran. Corn, tankage, oil meal and alfalfa meal, together with mineral supplements, may be started in small amounts about the sixth day. The full milk-producing ration should be reached about the tenth day, providing the litter is doing well. Baby pigs should make slight gains during the first ten days. Their delicate digestive systems must be carefully guarded during this period if enteric disorders are to be avoided. I have so frequently observed that hog raisers who call for medicine for baby-pig scours, are the same men who have enteritis in their weanling pigs and shotes, that I am led to believe that baby-pig scours is a potent factor in the future incidence of swine enteritis. Hence, a proper
feeding program for the parturient dam is the first step in rearing healthy, disease-resisting swine.

An acute, apparently infectious bacterial enteritis of baby pigs has been observed. These pigs are born with the disease or develop it during the first three days. Hastings of Illinois believes that scours may develop in utero. As evidence, he cites fecal matter in the fetal fluids. This condition is rapidly fatal. The history may reveal that the sows farrowing these pigs were affected with swine Brucellosis, or suffered with swine flu, or some other febrile condition during pregnancy. It is also admitted that sows which survive necrotic enteritis as gilts, or recovered from an attack of infectious hemorrhagic enteritis, may be the carriers of the infectious organisms and thereby transmit them to their offspring. Various biologics have been used to combat this serious malady with results rather confusing and not very satisfying. Prevention consists in selection of breeding stock known to be free of carrier diseases.

A common form of enteritis is observed in suckling pigs nursing udders covered with filth. This occurs after the sow and litter have been released from the farrowing pens. The following case report illustrates this type of enteritis:

The hog house was ill smelling. The pigs were tucked up. Pigs suffering from such enteric attacks seem to prefer to crowd to a wall when they defecate. In this case, the floors along the sides of the pens were filthy with pasty, greyish-colored bowel discharges. A search of the premises over which the sows ranged revealed that the cesspool from the dwelling house had overflown into a small hole in the hog lot. The sows had found this and laid in it. The filth hole was not more than four feet long and a couple of feet wide but was enough to contaminate the udders of the sows and thereby produce a catarrhal enteritis in the nursing pigs.

**Weanling Pig Enteritis**

Pigs from eight to sixteen weeks of age are frequently affected with necrotic enteritis, commonly known as “Necro” and “Drying-Up Disease.” Farms on which this is found usually abound in mud and filth holes, either as found on
poorly-drained premises or quarters which have been used for years and through some source became infected. Those owners who are careless regarding sanitation usually are careless or ignorant concerning nutrition. While weanling pigs fed a carefully-balanced and complete ration may do well, even in unsanitary lots, when malnutrition and unsanitary environment are co-existent, the pigs are very apt to come to grief. Many owners feed corn on the ear and ground-oats slop as grains and run the pigs on blue-grass pasture. This does not provide proper nutrition. The result is a chronic indigestion and a low-grade catarrhal enteritis. The sharp edges of the cracked corn and the hulls of the ground oats add mechanical irritation. That ground-oat hulls are damaging may be questioned by some, but I have so frequently observed necrotic enteritis in pigs fed ground oats that I am firmly convinced that ground-oat hulls are a contributing factor. I favor whole oats for pigs until they are near one hundred pounds in weight.

Pigs from two to four months of age, under unfavorable sanitary and nutritional conditions, as cited, may well be expected to develop the classical symptoms of necrotic enteritis, as persistent diarrhea, progressive un thriftiness, and variable appetites. The autopsied animals exhibit a greyish catarrhal exudate lining the intestinal mucosa and, in severe cases, more or less extensive areas of necrosis in the cecum and colon. Unless the disease is diagnosed early and proper sanitation, nutrition, and medication established, the death loss and general debilitation will render the drove a liability instead of an asset.

Reports have appeared in the literature, this year, suggestive of the nutritional aspects of necrotic enteritis. Davis and Freeman found that necrotic enteritis could be cured or prevented by feeding liver, yeast, and nicotinic acid. Madison, Miller, and Keith, of Pennsylvania State College, reported on a drove of seventy-six pigs, forty of which had died. The surviving pigs were on a ration of corn, oats, wheat middlings, tankage, and a limited amount of skim milk and they had access to a clean grass pasture. The pigs had
stopped growing, were without appetite, and were affected with diarrhea and a dermatitis. The pigs were given nicotinic acid in their feed. In six weeks, the entire drove of thirty-six pigs had completely recovered, growth having been resumed and the entire lot of pigs appearing to be normal.

The most disheartening aspect of necrotic enteritis in veterinary practice is the appearance of the affliction during the serum-virus vaccination period. I will illustrate from my practice:

A drove of two hundred and fifty head of eighty-pound shotes was being raised in a clean pasture. Hog cholera broke in an adjoining pasture on a neighboring farm. The day I vaccinated the sick drove, the above two hundred and fifty shotes were removed to the home lots. Now, the previous fall, this owner lost heavily in fall pigs from necrotic stomatitis. The two hundred and fifty head of McLean County System pigs were confined in the same lot used previously by the infected fall pigs. On the third day, after bringing these pigs home, I was called to vaccinate. I would have defied any man to detect anything but thrifty shotes at that time. The forgotten factor in this case may have been the lurking infection left in these premises by the fall pigs which suffered with necrotic stomatitis some nine months previously. About seven days after vaccinating, some of the pigs showed signs of the reaction. On the tenth day, the owner called for me. About fifty head were very sick. The autopsies revealed extensive necrotic enteritis. Twenty-five head were lost.

I could multiply case reports of latent enteric infections which became virulent as a result of the administration of serum and virus. Practitioners frequently find it advisable to institute enteritis treatment and to remove hogs from infected lots before giving serum and virus. Infectious necrotic enteritis constitutes a serious menace in cholera immunization of pigs.

**Infectious Hemorrhagic Enteritis of Swine**

This disease is well known to cattle and hog feeders in my section of Iowa who purchase feeder live stock in the marts of trade. The disease is characterized by a profuse diarrhea which contains mucus, tissue shreds, and varying amounts
of blood. It is commonly referred to by owners as "Bloody Scours" or "Black Scours."

Infectious hemorrhagic enteritis of swine appeared in Iowa in 1918 when it was observed in feeder hogs received from public stock yards. I have encountered the disease repeatedly during the last twelve years. Usually, it affects hogs which pass through stock yards or sales barns. I have also seen it in native farm-raised droves into which no imported hogs or other feeder live stock have been introduced. In many of these native cases, the source of the infection is almost obvious, such as surface drainage, stream pollution, and close proximity to infected feeding lots. The source may be suspected where there is exchange of labor and migrations of visitors, dogs, chickens, etc., from an infected premise. Many hog owners whose swine are immunized against hog cholera feel a false security concerning infectious diseases and thereby fall victims to the ravages of other important and devastating infections. It is the safe policy to suspect well-meaning visitors and hog-powder vendors as the means of transmitting infections and not permit them to enter hog lots.

Infectious Hemorrhagic Enteritis has been of such proportions that it has caused major alarm among swine raisers, commercial cattle and swine feeding establishments and veterinary practitioners throughout my section of Iowa. Even though practitioners realize the involved nature of this disease, they are still hoping investigators may soon make discoveries which will assist veterinary forces in the field, that an effective course may be charted when this disease is encountered. This malady is exacting an enormous toll in dead hogs and practitioners are struggling bravely in their attempts to protect the investments of their clients.

When infectious hemorrhagic enteritis is complicated with hog cholera, the owner of such swine and the veterinarian face a greatly involved and alarming situation. If serum and virus are administered, the enteric infection will most surely take advantage of the reacting swine and destroy
them. If the cholera virus infection is not checked, just as surely will it destroy the drove. In desperation, the veterinarian may suggest serum alone for a temporary checking of the cholera virus pending the treatment of the enteric disease. The temporary immunity to hog cholera afforded by serum alone is of fleeting duration and even though enormous doses are administered, serum alone may not hold hogs against a natural virus exposure in the presence of infectious hemorrhagic enteritis. I have attended many such cases with results almost uniformly discouraging.

Infectious hemorrhagic enteritis has been a serious menace to the sales barn industry. This industry is a development of recent years in Iowa. Within a radius of fifty miles of my office, there are at present twelve of these sales enterprises where consignment sales are held every two weeks. It is not uncommon to find several hundred head of swine passing through the ring in a single day at each of these sales. These sales have a large following of speculators who make a business of following the circuit and frequently hogs, circulating among these speculators, pass through several of these rings in a period of one to two weeks. Hogs in transportation and under irregular feeding are of lowered resistance, and readily susceptible to infections contacted in sales barn pens. Another factor is the opportunity for an owner of a diseased drove to cull out the visibly well, but exposed swine and rush them into the sales barn on a day of auction. An unsuspecting purchaser bids off such hogs and transfers them to his home premises where the newly-purchased swine may develop the original infection to which they were exposed and any cross infections contacted at the sales barn and thus infect and pollute the home-raised swine and the premises of the innocent purchaser. In all fairness to the sales barn industry, and state sanitary forces, I am prompted to state that, at present, there seems to be a curtailment of sales barn infectious hemorrhagic enteritis. In our State, the sanitary officials have set up veterinary supervision of these sales. Rigid inspection of swine offered for sale and rigid cleaning and disinfecting of sales barn
premises are instituted. This supervision appears to have accomplished a commendable reduction of enteritis in sales barn hogs. It is hoped that this is not a fleeting curtailment due to some vagary of the disease itself.

Other Specific Forms of Enteritis

There are other forms of specific enteritis, such as the enteric form of swine plague, and protozoan infestations as Balantidia, coccidiosis, and amebic dysentery. These may be demonstrated in given cases and when suspected should be subjected to microscopical examination of specimens and specific treatment instituted when such is available.

Non-Specific Enteritis

Non-specific enteritis are found as caustic-poisoning gastro-enteritis from continued feeding of too concentrated preparations containing such agents as lye and copper sulphate. The rather common practice of adding loose salt to slop results in chronic salt poisoning and enteritis. The indiscriminate practice of feeding dead animals to hogs produces its toll of enteritis cases. A pure bred boar was observed which ate freely of still-born and overlaid baby pigs. An acute and uncontrollable enteritis killed the hog. In non-specific enteritis, a careful investigation with the cooperation of the owner in supplying a true history usually reveals the causes and the key to control.

The imprudent and injudicious use of worming agents is responsible for cases of enteritis. It is my policy to use such vermifuges as are safe and harmless even to an inflamed intestinal wall. Nostrums sold by peddlers as vermifuges and swine tonics produce many cases of severe intestinal disorders. I wish to recite such a case:

A drove of seventy pigs, about eight weeks old, with their mothers, were in a clover pasture. The powder peddler convinced the owner that these pigs should be treated for worms and should be given a course of treatment with his powders, somewhat extended, I would say, for the farmer signed a note for fifty dollars. The pigs were taken to the hog house and starved for
SWINE ENTERITIS IN VETERINARY PRACTICE  

twenty-four hours. Whole oats were then placed in a trough and a solution of powder, as directed by the peddler, was poured over them. The hungry pigs consumed the feed. About four hours later, the farmer put in a hurry call for the peddler. After seeing the pigs, the peddler instructed the farmer that the pigs had acute cholera and to get them vaccinated immediately. The symptoms I observed were subnormal temperatures, champing of the jaws, salivation, extreme muscular tremors, some pigs were walking in circles and others were trying to climb the corners of the hog house. Several of the larger pigs were dead. The autopsy lesions were a severe gastro-enteritis. The diagnosis was caustic poisoning and this was confirmed by a consultant. A milk and oil-meal slop was prescribed. In all, thirty-five head of the pigs died. As previously stated, the farmer gave a note for the nostrum, which note he declared he would not pay and that he would sue the remedy concern for the loss of the pigs. Attorney advice was to the effect that the legal processes would have to be instituted clear across the state of Iowa and the amount involved would not justify the expense. The result was the aggrieved owner lost one-half his pig crop and paid fifty dollars for the privilege. And so we must add to the list of causative factors of enteritis, irritating so-called mineral and medicinal agents, and the ill-advised procedures commonly recommended by powder peddlers.

General Discussion of Farm Factors

I have endeavored to review the more common forms of enteritis as I have observed them in my veterinary practice. I wish now to present fundamental factors observed on farms where I have investigated swine enteritis.

Such farms are usually heavily cropped and of lowered fertility. The feeds produced lack in essential minerals and other elements. An attempt is made to produce gains by supplying a commercial feed to supplement the home grains. These commercial feeds are largely by-products from the industries and from which certain minerals, vitamins and proteins have been removed. These feeds are offered the farmer under such trade names as "Quick Growth," "Hog Fattener," etc., and are found on farms largely because of the efforts of suave salesmen.

The premises present the familiar spectacle of a dilapidated
central hog house surrounded by hog lots which contain mud holes caused by overflowing or leaky tanks or hog waterers. The manure from the hog house and usually the cow stable are dumped from the buildings into the lots. These premises bear evidence of long hard usage such as broken window lights, doors off hinges, broken cement feeding floors and fences, and large boulders piled into wallow holes.

Such factors as soil erosion and untidy premises at once suggest nutritive deficiencies and lurking infections and infestations. A visit to the feeding quarters reveals an added factor. Feed, usually partially-consumed corn, is lying before the hogs, and commercial feeds may be found stored in sacks. Pigs reared under unfavorable conditions of nutrition and environment may do quite well for a time when put on full feed. Then the appetites fail or become irregular and constipation, or the opposite, diarrhea, appears. These are the warning signs that chronic enteric disorders are approaching acute forms of enteritis. A few producers possess a working knowledge of nutritive values and efficient rations, and they have the gumption to provide environment favorable to the comfort, health, and rapid development of swine, or if they are in doubt, they have the intelligence to seek expert advice in these respects. Every practitioner may point out such swine producers and their restricted incidence of swine enteritis is a living example of the value of proper nutrition, production and environment.

One of the most frequent factors which menace swine health is parasitic infestations. According to Kinsley, intestinal parasites damage swine through obstruction of nutrition; obstruction of the lumen of the intestine and hepatic duct; the irritation of the mucuous membrane due to movement; irritation of mucous membrane due to lip attachment resulting in inflammation, necrosis and ulceration; and finally, through liberation of chemical substances which produce nervous irritation or hemolysis. The common idea held by farmers regarding damage done by worms is that they simply appropriate a quantity of the feed consumed by the host. This is a very inadequate
conception of internal parasitic damage. I believe hogs may consume volume enough of feed to nourish their own bodies and the worms they harbor providing the worms do not seriously damage the nutriment balance and the wholesome quality of the chyle left for the assimilation of the host.

Autopsies on pigs harboring large numbers of intestinal parasites reveal lungs and livers which bear evidence of the migrations of parasitic larvae and it is reasonable to believe that there is impairment of these organs in performing their vital functions—purification of the blood and elimination of body wastes. Body tissues are pale and flabby, the blood is thin and watery. Intestinal occlusion and mechanical irritation have resulted in local inflammation. The inflamed bowel superimposed on a poorly-nourished and toxic system is readily invaded by bacteria which so often are the faithful companions of internal parasites.

The concentration of bacterial infections and parasitic infestations come about as the result of increased numbers of swine. In this machine age, large acreages of grain crops have reduced grazing land to near the limit. Live stock and especially hogs have been crowded on small pastures. The large central hog house is permanently located and the adjacent lots are used year after year and it is rare that they escape contamination to the saturation point. There are two ways of destroying pathogenic bacterial and hog parasites, the one is by killing them with strong bactericides; and the other, is to starve them by vacating the contaminated hog lots, and adopting the clean-ground method. The latter is not popular with those over-busy farmers who have a top-heavy investment in machinery which they wish to keep busy in large fields suitable for tractor farming and not suitable to rotation in hog lots. A McLean County System drove of pigs requires every-day labor in hauling feed and water and the attendant inconvenience of many trips to the hog site. The farmer will agree that the McLean County plan is according to proper reasoning but his plea is "Too busy," and he attempts to scrub his permanent house and destroy the invisible bacteria and parasite eggs. He does not com-
prehend the magnitude of the job of efficient disinfection and does not accomplish it. The neglected corners of the building and the outside runs are not ridded of infections and continued use of the lots sustain and add to the concentration.

In conclusion, the clean-ground method for swine production is the greatest single factor available for successful control of enteric diseases of swine, add to this proper nutrition and sane methods of production and management and swine enteritis may be reduced to the vanishing point.

Summary

Swine enteritis is the practitioners' most troublesome disease of swine. Hogs of all ages are susceptible. Hogs suffering severe attacks of enteritis are unprofitable producers of pork. Enteritis is a serious menace to serum-virus reactions. Infectious hemorrhagic enteritis is the source of great economic losses in commercial cattle and hog feeding establishments. The chief factors predisposing to enteritis and the key to their control are related to nutrition, production, and sanitation.

References


Kinsley, Dr. A. T. Swine Practice, pp. 116-117.

PRESIDENT AXBY: This is to be discussed by Dr. Koen.

DR. J. S. KOEN: Mr. President and Gentlemen: Anyone acquainted with Dr. Bryant would expect just such a comprehensive presentation of the subject as he has delivered. To undertake to analyze it and discuss it, as it has been presented, would be just a waste of time here this morning. My suggestion is to consider the outline that Dr. Bryant has presented and check with your experiences. In that manner, we may be able to eventually find some solution to this aggravating problem.
DISCUSSION OF SWINE ENTERITIS


We have encountered many cases of "Enteritis" in swine this year in the course of our work. These cases have been very interesting to study and very baffling at attempts to control. It appears from cases coming under my own observation and those reported by practicing veterinarians that this condition has caused greater losses in Western Iowa during 1939 than has been caused by hog cholera. It is possible it has resulted in greater losses than those from hog cholera and all other diseases of swine combined during the past six or eight months.

The condition encountered so frequently this year has been most often a COLITIS, or a Gastro-Colitis. Very few herds so affected have shown involvement of the small intestine, such as we encountered years ago and termed "Necro."

In the majority of cases the COLITIS was accompanied by a bloody discharge from the cecum, colon, and rectum. In a few instances great masses of clotted blood was found in the rectum. However, in several herds the condition was so acute the pig, shote, or hog would die before hemorrhages had time to appear. The owner would report the pig came up and eat heartily then fall over dead at the trough, or die within an hour or two after eating. Nothing had been noticed wrong with these animals previously.

The condition strikes herds kept on "new" clean ground and under good sanitary surroundings just as it hits other herds kept in filth.

It has hit herds of pure bred shotes, small herds receiving almost individual attention, just as it has hit herds badly neglected.

It strikes herds being fed in apparently a proper manner and other herds where the feeding ration is open to serious questioning.
It attacks herds that have had no serum and virus as it does other herds that have been vaccinated with anti-hog cholera serum and virus.

When hog cholera virus is administered to herds already infected with "enteritis" the results are usually disastrous. It will strike herds long after vaccination just as it does herds never so treated.

Treatment has been disappointing. Alkaline solutions are used extensively and must be of some value. However, the farmers have the notion that "alkaline solution" means simply LYE and much inhumane treatment of sick hogs has resulted.

Since none of the laboratories have been able to establish a specific cause for this condition, they have likewise been unable to prescribe a treatment that is consistently successful.

SANITATION will do much in controlling the condition, undoubtedly, and two herds kept under sanitary conditions but differing widely in the form of sanitary system employed are worthy of consideration here.

The first herd is the largest herd in Iowa, I believe. Two hundred and twenty-one sows farrowed and saved about 1,400 pigs last spring. Nearly all of these 1,400 pigs were vaccinated with anti-hog cholera serum and virus last August. They were in good healthy condition, no parasites either external or internal, no "barnyard infection," just good pigs. No "post-vaccination troubles" followed after the treatment with serum and virus. Later they were permitted to follow the feeding steers and no "enteritis" appeared. Ten years ago the owners of this herd were having all the pig and hog troubles usually encountered on the average Iowa farm. They changed to a swine sanitation program and remarkable success has been obtained each succeeding year. They employ a modified McLean County system of swine sanitation.

The other herd was raised by John Hendricks, near West Liberty. Ninety-two pigs were farrowed during February and early March. They were never permitted at any time to be off of concrete. The hog house has a concrete floor and a concrete runway about 20x70 feet extends beyond the entrance to the hog house. By brushing or sweeping this concrete between each
feeding, and scrubbing it two or three times a week, these pigs never had a chance to contact infection. Clean feed, clean water, and clean quarters enabled Mr. Hendricks to market these hogs at six months of age averaging 243 pounds. These hogs dressed 75.86% and were produced at a cost of 2 ¾ c per pound, with corn figured at 50c and oats at 30c per bushel.

While the experience of these two herds may not have much direct bearing on the condition under consideration, they most certainly do show that SANITATION pays big dividends in healthier hogs.

PRESIDENT AXBY: We thank you, Dr. Koen. It is very gratifying to me to have made some recommendations, not knowing what discussions were going to be entered into or what papers would be presented, and to have those recommendations carried out at this next meeting. I am very delighted about it.

The next paper is entitled, “So-called Protein Poisoning in Swine,” by Dr. A. F. Schalk, professor of preventive veterinary medicine, Ohio State University, Columbus, Ohio. (Applause.)

DR. A. F. SCHALK: Mr. Chairman, and Gentlemen: I am not going to discuss all of this subject. I found, after taking the first part of it, “Protein Poisoning,” that I had a paper that was sufficiently lengthy, and I realized that the latter part of this subject was of sufficient importance for a paper to come later.

SO-CALLED PROTEIN POISONING IN THE FEEDING OF SWINE

By A. F. SCHALK, Professor of Preventive Veterinary Medicine, Ohio State University, Columbus, Ohio.

In the course of time and human activities practically all science, either fundamental or applied, becomes enhanced by evolutionary changes which invariably tend toward progress and the betterment of the conditions involved.

However, not infrequently, man is too prone to draw hasty, immature, and often faulty conclusions as regards some matters that are only in the initial or early developmental stages and before they have been subjected to the
necessary experimental scrutiny which usually insures
definite and reliable knowledge.

Such situations may and do occur in Veterinary Medicine
and develop in a variety of ways. It sometimes occurs with
the over-ambitious investigator who fears that he will lose
priority of his work, so he issues a hasty communication
based on incomplete and uncontrolled results. Again, it
may be a high-pressure salesman with a hastily prepared
and untried product who is chiefly, if not solely, concerned
about the commercial aspects of his wares, regardless of its
efficiency and economic significance to his client and the live
stock industry.

Then, there is the veterinarian who is careless and makes
only a superficial examination of the patient and an incom-
plete survey of surrounding conditions, or is not quite sure
about his basic knowledge of animal diseases and will not
confess that he does not know, but, in lieu of this makes a
definite diagnosis to the owner that is entirely wrong. Other
ways could be cited, but it is hoped that these will suffice to
illustrate the point in question. It would appear that the
latter regrettable situation has found repeated and numerous
applications during the past few years by some veterinarians
in their diagnosis of protein poisoning in swine.

Before approaching the subject of protein poisoning, it
might be advisable to refresh our minds as regards the
nature and the role of proteins as basic and vital constituents
in the feed rations of healthy swine.

As early as 1864 Wolff set up feeding standards in which
he listed the amounts of digestible protein he believed neces-
sary for the various classes of live stock. Naturally, those
standards have been revised in the course of subsequent
experimentation in nutrition. Out of these investigations
two timely basic principles involving protein have been
thoroughly established, viz., that animals must receive at
least certain minimum amounts of protein and that quality
or kind of protein in the ration is fundamentally as essential
as the amount.
The vital role of the proteins in the animal economy, i.e., the building of body tissues and the repair thereof, is perhaps common knowledge to us all.

Possibly most all concerned know that proteins are quite complex substances that require considerable cleavage or breaking down before they can become component parts of body cells. And, that this cleavage begins with the native true proteins and amids and transforms them into peptones and proteoses and finally to amino acids before they can be absorbed. The amino acids are quite soluble in the intestinal juices. Hence, they enter the blood stream as a mixture of free acids and are transported to all parts of the body where each organ, tissue or cell selects exactingly the quantity and the specific kinds of amino acids that are required for its growth, repair and function.

So much for the importance and necessity for a minimal amount and the proper kind of protein in the ration. But how about the effects of an excess of proteins in the diet?

Data on carefully controlled experiments with an excess of protein, particularly with swine, are significantly scarce. However, well checked work on rats and an abundance of information gathered from practical demonstrations on dairy cattle and humans indicate very strongly that they are harmless.

In certain tests rats have been grown normally insofar as could be determined, on 90\% protein. Dairy cows have been fed successfully for long periods of time (during entire lactation period), on cotton seed meal as the only concentrate when same was adequately supplemented with proper vitamins and minerals. It will be recalled that previous to the advent of soy-beans that cotton seed meal was our chief source of plant protein and contains a very high percentage of this essential nutrient.

Recently, two men went on an exclusive diet of meat (with a minimum of fat), for eleven consecutive months with no detectable disturbances in their health. Then, I
think that we are all quite familiar with the fact that eskimos feed almost entirely on fish throughout the normal life span, and fish meal ranks about "tops" in protein content of animal origin.

Lastly, we personally know of some farms where soybeans have constituted a major portion of the rations of horses, cattle, sheep and swine for four to five months of the dry-feed season over a number of years. The soybeans are chiefly used in hay form in which the hay was harvested anywhere from the early immature bean stage to practically ripe berries. Also, during these many years, they have been grown in a variety of soils and under diversified climatic conditions in which they were sometimes stunted in their growth and development by droughts and occasionally frosted in the immature bean stage. Yet, through all this, there has been no evidence of ill-health of their live stock, traceable to the soybeans

Protein Poisoning. Perhaps we had better raise the point as to what constitutes a poison? Many interpretations could be made of this term. However, from a medical standpoint, we can sum up the condition quite satisfactorily by stating that a poison is any toxic, baneful or pernicious substance or agent, when taken into the body or formed therein, brings about a morbid state which impairs the health or leads to the death of the organism. When such a state is established the condition is attended by morbid changes in more or less body tissue which manifest themselves by disturbed functions which we interpret as symptoms. In other words, a poisoned animal is one in which the implicated toxic substance has produced lesions of either gross or histologic proportions. Such lesions or pathology manifest themselves by a chain of symptoms indicating that the norm or physiologic state has been greatly distorted or disrupted. The accompanying symptomatology may be sufficiently characteristic in some instances to be diagnostic of some one or group of poisons. Consequently, before any substance can be justly termed a poison, it should be capable of fulfilling the foregoing medical deductions, i.e., exhibit lesions, disturb
body functions, impair health or cause death of the organism involved.

The so-called protein poisoning is a relatively new coined term of rather recent origin. Veterinary literature contains but few articles pertaining to it, and in these the condition is so ill defined and lacking in consistent symptoms and pathology that the reader remains confused and wonders how the author could arrive at a definite diagnosis.

As an example of these irregularities and inconsistencies in diagnoses, one states, among other things, that the condition is attended by a high temperature, 105° to 106° F., and higher. Another indicates that it is chiefly gastric and intestinal disturbances that prevail. Others associate respiratory acceleration with the condition and some attribute it mainly to a toxemia. Most all mention an incoordinated stiff gait with sore feet as the outstanding feature. Surely, the latter symptoms cannot be considered pathognomonic and significantly diagnostic of any one specific condition. In connection herewith, one must give due consideration to swine erysipelas. Cold, damp concrete floor, nutritional disturbances, and possibly other predisposing causes.

Perhaps the term is used mostly in the field when the veterinarian is confronted with an obscure condition. This is particularly true if the owner has made a sudden change in the feed rationale and especially so if his client informs him that the new feed contains a protein supplement. In the absence of characteristic evidences of some specific disease, how very, very easy it is for him to say, yes, it is a case of protein poisoning and waive further responsibility in the matter.

However, if he only would have given the case more than casual consideration by making a careful physical examination and a thorough survey of the environmental conditions surrounding the individual and the herd, and complemented this with a detailed autopsy (if available), and lastly, if necessary, sending appropriate tissues to a diagnostic laboratory, the real condition and causative agent could often
be determined and a correct diagnosis made.

Recently some special studies by Newberg appeared to corroborate this very hypothesis. He fed rabbits on excessively high protein rations. Subsequently, nephritis of an acute, sub-acute or chronic nature developed in all the animals. Naturally this pathologic condition was attributed to the excessive protein. However, more carefully conducted experimentation on the problem failed to confirm the high protein theory as the primary cause of the nephritis. It developed that Newberg's rations were greatly out of balance as regards the other dietary requisites and nephritis developed regardless of a high or low protein intake. It later occurred that supplementing such protein diets with cabbage, entirely obviated the kidney derangement.

Further, the controlled researches of Osborne and Mendel lend additional evidence of the innocuousness of high protein levels in rats. Animals fed solely on protein, adequately supplemented with vitamins A and B, and necessary minerals, tripled their original weight. They observed significant enlargement of the kidneys when the rats were kept on the high protein diets for an extended period of time. Later investigations by these workers along this same line revealed the fact that kidney hypertrophy was a consistent occurrence in rats maintained on a ration containing a high protein content. In lieu of the enlarged kidneys they could not demonstrate any material perceptible pathological changes or disfunction in these organs.

During the past year, Mr. W. L. Robison, swine specialist at the Ohio Agricultural Experiment Station, Wooster, conducted some controlled experiments on swine with high protein feeds and supplements. To say the least, they are quite interesting and truly enlightening as they pertain to the protein problem in swine.

Two groups of four (4) pigs each were used. They were all from a litter farrowed December 17, 1938. The experiments were begun April 11, 1939, at which time both lots of
pigs weighed approximately 69 pounds. Lot 1 was fed a ration which at first consisted of:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Yellow Corn</td>
<td>28 lbs.</td>
</tr>
<tr>
<td>Fish Meal</td>
<td>17 &quot;</td>
</tr>
<tr>
<td>Meat Scraps</td>
<td>17 &quot;</td>
</tr>
<tr>
<td>New process toasted soybean oil meal</td>
<td>22 &quot;</td>
</tr>
<tr>
<td>Expeller cotton seed meal</td>
<td>12 &quot;</td>
</tr>
<tr>
<td>Ground alfalfa</td>
<td>4 &quot;</td>
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Beginning with the fifth week, a half of one per cent of cod-liver oil was included in the ration. After the first 8 weeks, in order to avoid any possibility of the cotton seed meal exerting a toxic influence, it was treated with a solution of ferrous sulfate or copperas at the rate of 2 pounds of copperas for each 100 pounds of cotton seed meal. The concentrate was composed of:

<table>
<thead>
<tr>
<th>Ingredient</th>
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<tbody>
<tr>
<td>Fish meal</td>
<td>23.5 lbs.</td>
</tr>
<tr>
<td>Meat scraps</td>
<td>23.5 &quot;</td>
</tr>
<tr>
<td>New process toasted soybean oil meal</td>
<td>32. &quot;</td>
</tr>
<tr>
<td>Expeller cottonseed meal</td>
<td>15. &quot;</td>
</tr>
<tr>
<td>Ground alfalfa</td>
<td>6. &quot;</td>
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It analyzed 55.0 per cent of protein and 10.7 per cent of ash or minerals.

Following the second four weeks' period Lot 2 was again given no protein concentrate. This third period was of three weeks' duration. For the last two weeks the protein concentrate once more was kept before the pigs in a separate compartment of the self feeder. This plan of feeding afforded some information as to whether pigs which had received no supplement for some time would eat unusually large amounts if given free access to it, and if so, whether they would suffer any ill effects from the abrupt change in their ration.

In the periods in which they received a protein concentrate, the pigs in Lot 2 gained more rapidly and made much greater gains per unit of feed consumed than they did in the periods when no protein concentrate was fed. Although they ate exceptionally liberal quantities of the protein concentrate whenever it was available, so far as was observed or indi-
cated by the data, its effect was not harmful but beneficial to them. Their droppings were normal throughout the experiment.

The pigs in Lot 1 on the high protein ration began scouring soon after they were placed on feed. The looseness of their bowels persisted throughout the experiment but was thought to be slightly less pronounced during the early than during the latter part of the experiment. The change was observed shortly after the treating of the cotton seed meal with a solution of iron sulfate was started.

The ration was palatable and despite the scouring the appetites of the pigs remained unimpaired. Full fed pigs on normal rations usually consume around 4 pounds of feed daily for each 100 pounds of their live weight—a little more while they are young and a little less as market maturity is approached. For the four periods, the pigs in Lot 1 consumed average of 4.37, 4.04, 3.87, and 4.06 pounds daily per 100 pounds of their live weight, respectively.

These eight (8) hogs were slaughtered July 12, 1939, at the Nutritional Conference for Veterinarians at Ft. Wayne, Indiana, and it was my privilege, assisted by Dr. H. J. Stafseth, of Michigan State College, and Dr. Frank Carr, state veterinarian of Ohio, to conduct veterinary inspection upon these animals. Upon most careful inspection of these animals, we found no evidence whatsoever in the way of lesions or gross pathology that would indicate the presence of poisoning of any nature. Therefore, if none of these animals exhibited any noticeable symptoms of ill health throughout the entire feeding periods, and the autopsies revealed no perceptible gross lesions, it is logical to conclude that histo-pathology was also absent or negligible.

Toxicity may arise from proteins other than the far fetched possibility of poisoning resulting from the ingestion of immoderate quantities of this essential factor in feed rations. I refer to certain cleavage products, and more particularly to decomposition products of proteins. These may, under certain conditions, prove exceedingly toxic.
Apparently, it is met with much more commonly in the human family than in domesticated animals, especially in the classes of the larger farm animals.

Then there is the anaphylactic aspects of proteins that might possibly be confusing to the uninitiated. This, however, should not befog the issue with anyone who possesses at least the first rudiments of the anaphylactic phenomenon.

Practically all animals can be sensitized to proteins, either simple, conjugated or derivative, as well as with certain protein cleavage fractions, by their parenteral injection into the body. On the other hand, sensitization is but rarely accomplished by ingestion of proteins, as only a minimal amount of these products as such, are capable of penetrating the intestinal mucosa, directly entering the circulation and sensitizing the host in the ideal way. If this method of sensitization were to succeed, there still remains the necessity of absorption of additional and a greater quantity of the same specific protein from the intestinal tract, within certain time limits, in order to precipitate classical anaphylaxis.

The problem of food allergies, long since recognized in man, still remains questionable and rather ill-defined in the minds of many as they pertain to farm animals. Food sensitization manifests itself chiefly as an individual idiosyncrasy rather than a generality in a group, flock or herd, and invariably, it is confined to an insignificant percentage of peoples or animals eating the food involved.

If we assemble all of the loose ends of the inconsistent rumors floating about and likewise all of the dependable data emanating from the reliable controlled experiments on the problem, one cannot possibly, with a clear conscience, confirm the diagnosis “protein poisoning.”

As yet, positive evidence that protein, even when fed in excessive amounts, will produce poisoning in swine, is entirely lacking. Are not some veterinarians “playing hunches,” just guessing, or plainly incriminating some perfectly good and safe protein feed or supplement when they casually say...
“protein poisoning?” This may prove to be a very, very serious matter. In so doing, one might be wrongly condemning a perfectly good and safe feed ration or supplement, to the extent that the owner may remove entirely some food factor that is absolutely essential for good growth and development of the animals.

In view of our present limited knowledge of a definite nature on the subject, it is suggested that the diagnosis of protein poisoning be suspended for the time being, or until further controlled feed experiments can be carried out and the matter satisfactorily solved.

I think many of us can recall quite vividly, how hemorrhagic septicemia rode the crest of the wave of popularity in the teens and the early twenties. Now, we most all realize how that condition was magnified and overdrawn in many instances. Therefore, we can profit from that mistake if we will, as regards the so-called “protein poisoning” in swine. By so doing, we may avoid considerable embarrassment to us individually and to the profession in general, by carefully safeguarding our diagnosis in such cases until we have more conclusive evidence on the subject.

DISCUSSION

PRESIDENT AXBY: Discussion of this subject matter will be made by Dr. H. C. H. Kernkamp, associate professor of Veterinary Medicine, University of Minnesota, St. Paul, Minnesota.

DR. KERNKAMP: President Axby, and members of the Association: The essayist presented many important and significant aspects of the “So-called Protein Poisoning.” I certainly cannot add much to this. I would like you to recall a definition that he gave pertaining to poison, and, if we were to follow a terminology such as has been applied to this thing, I look upon that as a specific terminology which can mean but one thing — nothing more than poisoning by protein.

I would again bring to your attention a definition of poison. A poison is any substance which, acting through its inherent chemical properties, and by its ordinary action, is capable of destroying life or seriously endangering health. The definition, given by the essayist, is very similar to this one.
Reviewing the available literature on proteins and protein poisonings, I can find but two true proteins that are recognized as poisonous substances. One is the toxalbumin obtained from castor beans and rice, and the other a toxalbumin obtained from the jequirity beans, known as abrin. These two are recognized as true toxins, true poisons, and will produce symptoms and death if consumed in sufficient quantities.

Crotin and phasin are also toxic substances obtained from plants that are probably not true proteins. They are probably glucosides, and there are, of course, many glucosides that would be toxic.

Of all the other proteins that are likely to be ingested as foodstuff for swine, I find none recognized as true poisons. The probability that swine will be fed castor beans or jequirity beans is, of course, very slight. So, I feel, as Dr. Schalk presented, that the term has been very loosely applied, and, of course, is quite confusing. I feel that in most of these cases where protein poisoning has been stated as the cause of the disease, the investigation has not been carried far enough to really illucidate the factor.

With these few remarks, Mr. Chairman, I conclude. (Applause.)

PRESIDENT AXBY: Thank you. Certainly we have been well paid for having this opportunity of listening to these papers and discussions on these troublesome problems.

Now to come to reports by Committee Chairman. The first one is on Uniform Laws and Regulations, which is to be read, as I understand, by Dr. Miller.

DR. MILLER: Mr. President, Members of the Association, and Visitors: As many of you know, this year there are two committees dealing with the matter of unification of regulations. To the committee of which I am a member was assigned the duty of summarizing the laws and regulations governing the interstate movement of live stock and the drafting of uniform laws and regulations, so far as possible, including B. A. I. regulations pertaining to the interstate shipment of live stock.
The first part of this task has been performed, and I shall submit for your consideration an analysis of the summarization of laws and regulations. We have not carried out the second part of this program.

Since coming to Chicago the members of the two committees have conferred, and it was their unanimous opinion that a joint report should be submitted by the two committees and I have been asked to present this joint report, which, I am pleased to say, is not very long.

**COMMITTEE REPORT ON THE SUMMARIZATION OF LAWS AND REGULATIONS GOVERNING THE INTERSTATE MOVEMENT OF LIVE STOCK**

**DR. L. H. LYTLE, Chairman, Salem, Oregon**

**DR. A. W. MILLER,**

Washington, D. C.

**DR. H. E. CURRY,**

Jefferson City, Missouri

**DR. H. C. RINEHART,**

Springfield, Ill.

**DR. R. W. SMITH,**

Concord, New Hampshire

During the past two or three years there has been gradually mounting criticism of so-called interstate trade barriers. This culminated in a meeting of the Council of State Governments in Chicago on February 11 and 12 of this year, in which the United States Department of Agriculture participated.

Following this, various agencies in the Department were called upon to prepare material that would show graphically the variation in federal and state requirements, especially those relating to restrictions on the interstate movement of plants and animals. Such material was prepared by the Federal Bureau of Animal Industry to cover its requirements and those of the various states with reference to Bang's disease, tuberculosis, scabies in sheep, the movement of swine for purposes other than immediate slaughter, and glanders. A limited number of copies of these compilations are available here for your inspection.

Doctor Lytle, chairman of the Committee to Summarize Laws and Regulations Governing Interstate Movement of Live Stock and Draft Uniform Laws and Regulations So Far as Possible Including B. A. I. Regulations Pertaining to Interstate Shipment of Live Stock, has asked me to present a summarization of the inspection requirements of the various states and of the Federal Bureau of Animal Industry, dealing particularly with the five items I have just mentioned.

**State Requirements**

**Bang's Disease**

Taking up Bang's disease which is receiving a great deal of attention at this time, it is found that all 48 states have requirements more
or less restrictive on cattle imported for purposes other than immediate slaughter. In order to simplify this presentation as much as possible, our summarization of regulations on Bang's disease has been grouped under eight headings.

**General**

This general heading shows that 41 states require a health certificate and test. Thirty-four of the states specify that the test must be made within 30 days of shipment, five within 21 days, and two give no specified time. Since this compilation of Bang's disease requirements was made, another state has advised us that its requirements are a health certificate and test made within 10 days prior to shipment.

Ten states require a permit, but two of these, as an alternative to the general rule of a health certificate and test made within a specified time of 30 days or less, will accept cattle subject to quarantine and test at destination.

Two states do not require the test on calves under 5 months of age, twenty-five place the age limit at 6 months, and one state requires a test within 30 days of shipment on all calves. We have no definite advice as to the requirements of the remaining states on calves.

Three states specify that the test must be by the tube method, and two require that the test be made in a state laboratory.

One state has a quarantine on cattle for resale unless from accredited herds, and two states require a quarantine of from 60 to 90 days and a retest on importations.

Seven states will not accept reactors for purposes other than slaughter, and three states will accept reactors on a permit.

**Cattle Originating in Accredited Herds**

On cattle from accredited herds, two states require a herd test within 6 months of shipment; one state requires two tests within 1 year; twenty-four a herd test within 1 year; and three a herd test within 1 year and an individual test within 90 days of shipment of animals to be imported. Except in the case of four states, these requirements are modifications of the general rule of a health certificate and test made within a specified time of 30 days or less.

**Bang's Disease Free Area**

Three states indicate that they will accept importations without any test requirements from Bang's-free areas.
Cattle Originating in Herds Under State and Federal Supervision

On cattle from herds under state and federal supervision, one state requires a negative herd test within 30 days of shipment; a second state within 3 months of shipment; a third within 3 months and an individual test within 30 days of shipment; a fourth within 3 months and an individual test within 60 days of shipment; a fifth two negative tests within 6 months of shipment; two other states a negative herd test within 6 months of shipment; another state a negative herd test within 6 months and an individual test within 60 days of shipment; and another two negative tests within 12 months, the last of which shall have been within 6 months of shipment. These are all modifications of the general rule of a health certificate and test within a specified time of 30 days or less, with the exception of two states which do not have any general rule.

Cattle in Herds Not Under State and Federal Supervision

On cattle in herds not under state and federal supervision, one state will admit animals from a herd which has passed a negative test within 3 months of shipment. Another state admits female cattle originating in herds which are 95 per cent free, provided the animals to be imported have passed two clean tests within 90 days, the last one of which shall have been made not longer than 30 days before shipment, and in addition shall pass a retest within 90 days after arriving at destination. The same state will admit animals originating in herds which have passed a free test not longer than 6 months before shipment, except bulls which must pass a test within 60 days prior to shipment. A retest is required on such animals within 60 days after arriving at destination.

Exhibition Cattle

Two states require that animals for exhibition be from accredited herds; one state that they be from Bang’s disease free herds; one state that they be from Bang’s free herds and have been tested within 90 days of shipment; and three states that if they are from herds not under supervision they shall have been tested within 60 days of shipment.

Feeder Cattle

Ten states exempt steers and one state exempts spayed heifers. Seven states require a special quarantine, and one state a quarantine and test at destination if facilities at point of origin are not available. One state requires a negative test on female cattle and bulls, and another state a negative test on bulls immediately prior to entry. One state exempts females and bulls that are to be spayed or castrated within 10 days.
Range Female Cattle of the Beef Type

Two states indicate that they have no requirement on range female cattle of the beef type.

To illustrate the extreme variations that occur in these requirements, reference is made to one state which will permit the importation of cattle that have passed a satisfactory test within 30 days of shipment, whereas on cattle originating in accredited herds it requires a herd test within 6 months of shipment and on cattle originating in herds under state and federal supervision a negative test within 3 months of shipment.

I am leaving this Bang's disease subject with you with one question, and that is, why this great lack of uniformity in state requirements.

Tuberculosis

There are nine states and the District of Columbia which permit the entry of cattle in accordance with federal regulations to prevent the spread of tuberculosis.

Four states require the tuberculin test on all cattle, including steers.

Dairy and Breeding Cattle from Modified Accredited Areas

On dairy and breeding cattle from modified accredited areas, 29 states require a tuberculin test record and 34 states a health certificate. Some of these states require both the test record and health certificate.

Fourteen states require a tuberculin test, the period of time that the test must be applied before entry varying from 30 days to 1 year.

Eleven states require a permit and one state requires that a retest be applied after destination is reached.

Two states which require a permit provide that the animals must originate in accredited herds or modified accredited areas.

Feeder Cattle from Modified Accredited Areas

Nine states require a tuberculin test record on feeder cattle from modified accredited areas, and seventeen require a health certificate. Some of these states require both the health certificate and test record.

Ten states require that a permit must be obtained and one state requires a retest at destination.
Eight states impose a quarantine at destination and two require branding of feeder cattle.

One state which requires a permit also provides that the cattle must originate in accredited herds or modified accredited areas.

**Dairy and Breeding Cattle from Non-Modified Accredited Areas**

Six states require that a permit be obtained on dairy and breeding cattle from non-modified accredited areas, and five that a retest be applied at destination, only one of these requiring both a permit and retest at destination.

**Feeder Cattle from Non-Modified Accredited Areas**

Nine states require that a permit be secured on feeder cattle from non-modified accredited areas, six states that the animals be quarantined at destination, and two that a retest be applied at destination. Some of these states have two of these requirements but none of them has all three.

**Scabies in Sheep**

There is a great variety of requirements governing the admission of sheep. Thirteen states and the District of Columbia permit the entry of sheep without imposing any restrictions other than those in the federal regulations to prevent the spread of scabies.

Six states require a prior permit and five states a prior notice, but in the case of one state the notice is on rams only and in another notice is required only if the sheep are from a quarantined area.

Twenty-nine states require a health certificate but this requirement on the part of one state applies only to sheep originating in one state.

Sixteen states require one dipping but in the case of eight of them this provision is not a general one, but is applicable only under certain circumstances, as when the sheep come through public stockyards or are from states which are not classed as scabies free. Five states require two dippings under certain circumstances. In one of these the requirement applies to rams only; in two states if the sheep are from quarantined areas; in another if the consignments pass through public stockyards; and the other state requires two dippings on all sheep except those from scabies-free states.

Two states require that animals be branded and fifteen states that they be loaded in clean and disinfected cars or other vehicles, but in the case of two of these states the cleaning and disinfecting requirement applies only when rams are to be shipped.
Five states require a quarantine at destination and four states a quarantine and dipping at destination. However, two of these states require quarantine and dipping only of rams.

Swine for Purposes Other Than Immediate Slaughter

The general rule is that swine shipped for immediate slaughter to any public stock yard or recognized slaughtering center are admitted without any restriction.

Six states require an affidavit by the owner or shipper that the animals have not been exposed to cholera. In the case of one of these states the provision is applicable to pure bred animals only, and in the case of another to animals for breeding purposes. One state requires an affidavit by the owner or shipper that the animals have been inoculated with anti-hog cholera serum or with serum and virus.

Thirty-three states require a health certificate showing serum or serum and virus treatment. However, there is considerable variation in these regulations as to the time required to elapse between immunization and entry into the state.

Five states require a veterinary health certificate and one of these double treatment of the animals if they have been exposed.

Two states require a permit in advance of shipment, and one state has no specific requirements except that the animals be free from disease and exposure.

Most of the states require that animals for purposes other than immediate slaughter be transported in clean and disinfected crates or vehicles.

Glanders

Four states require the mallein test, health certificate, and a special permit, and six states the mallein test and a health certificate.

Twenty states require a health certificate only, one state a health certificate and permit, and two states a permit only.

Fifteen states and the District of Columbia do not require the mallein test, health certificate, or permit.

This last group of states has uniformity without, so far as we are advised, having in any way endangered the horse population of their states. It is a matter of regret, at least to me personally, that with the practical non-existence of glanders in this country ten states require mallein test.
Federal Requirements

The federal regulations governing the interstate movement of live stock are contained in B. A. I. Order 309.

REGULATION 1

Regulation 1 of that order is general in character, containing definitions and rules pertaining to the quarantine of diseased live stock, the prohibition against the interstate shipment of diseased animals, and the requirements to be observed in the cleaning and disinfecting of cars, boats, other vehicles, yards, and premises.

REGULATION 2

Regulation 2 contains the provisions to prevent the spread of splenetic or southern fever in cattle and to accomplish its eradication. At the present time there are under quarantine for fever ticks two counties and parts of four counties in Florida, six counties and parts of three counties in Texas, and approximately the eastern two-thirds of Puerto Rico.

REGULATION 3

Regulation 3 is designed to prevent the spread of scabies in cattle. At the present time there is no area in the United States under quarantine for cattle scabies. This regulation prohibits the interstate movement of cattle affected with scabies but makes provision for the interstate movement of animals exposed to the disease, and provides for the treatment of cattle affected with or exposed to scabies preparatory to interstate movement. The regulation contains a provision requiring the certification of all interstate shipments from public stockyards.

REGULATION 4

Regulation 4 deals with the interstate movement of sheep affected with scabies. In general, its provisions are similar to those in the preceding regulation for cattle scabies. At the present time there are under quarantine for scabies four parishes in the state of Louisiana, and twelve counties and part of one county in the state of Mississippi.

REGULATION 5

Regulation 5 prohibits the interstate movement of horses and asses from areas quarantined for dourine without proper certification. At the present time this disease has been practically eradicated from the United States, and there is no area under quarantine.
Regulation 6 prohibits the interstate movement of swine which are diseased with hog cholera or swine plague, or other infectious, contagious, or communicable diseases. The most important provision in this regulation is the one which prohibits the interstate shipment of swine from public stockyards for feeding, breeding, or stocking purposes unless they have been immunized under Bureau supervision. It specifies the procedure that must be followed in the immunization of the animals.

Regulation 7 is the one that deals with tuberculosis. The only requirement of cattle originating in accredited herds in either modified accredited areas or in non-modified accredited areas is a certificate showing that the cattle have originated in such herds.

On dairy and breeding cattle originating in modified accredited areas the only requirement is a certificate showing that the cattle have originated in such areas. Where such cattle have originated in a non-modified accredited area, the requirement is a health certificate and tuberculin test.

On feeder and slaughter cattle originating in a modified accredited area there is no requirement, but on feeder cattle originating in a non-modified accredited area a health certificate and tuberculin test is required. Certification or testing is not required of slaughter cattle or those destined to public stock yards. However, if cattle are shipped to public stock yards under this provision and are then sold to go to the country as feeders or stockers they must be tested and certified.

Cattle which have reacted to the test for tuberculosis may be shipped under permit to points under Federal inspection irrespective of whether they have originated in modified accredited areas or in non-modified accredited areas.

The provision that under certain circumstances pure bred breeding animals which have reacted to the tuberculin test may be returned to the owner, is no longer in effect.

At the present time the Federal Bureau of Animal Industry has no regulations with reference to Bang's disease.
Unification of state sanitary laws and interstate shipment regulations is a thing greatly to be desired but difficult of achievement. A careful survey reveals that only where there are already federal laws and regulations passed or promulgated, governing the interstate movement of live stock, is there a semblance of uniformity in the interstate test and inspection requirements.

This is not a condition peculiar to animal disease control work. The same condition is met with in plant disease control and doubtless all other regulatory matters that concern the interstate movement of animals or materials coming under police restrictions. We have made some progress toward unification of our interstate livestock sanitary shipment regulations as will be shown by the summarization report as presented by Dr. Miller.

The plant disease control workers are achieving increased uniformity in their quarantine and interstate shipment work by adopting the regulations of the Federal Plant Disease Control Board,—in other words, by annulling many of their present quarantines and adopting the federal standards. Such a similar procedure as it relates to animals could well be carried out by all of our states and political subdivisions—one, namely, the District of Columbia, uses more or less this plan at the present time.

If such a plan of unification would be considered for animal disease shipment control, it would be necessary for the federal government, through its Bureau of Animal Industry, to both legislate and regulate as regards the disease control incident to the interstate movement of
certain species of our domestic animals which, at the present time, is not covered by any form of federal regulation.

The drafting of a sample uniform law and set of regulations would, in our opinion, at this writing, accomplish little or nothing. Federal regulations so far as they have thus far been promulgated, and will in the future be added to, could be made use of for standardization through promulgation and adoption by the various states. We could all, as official state sanitarians, aid by making early or immediate uniformity in many of our interstate certificate forms. There is a pressing demand for more care in preparing the certificates so as to insure the maximum legibility. By sending the second sheet, that is, the first carbon copy to the official at destination, would insure a better copy, as also would the use of a bluish-colored paper which makes the most legible carbon copy. By getting assurance from the various states, through their animal sanitary officials, that they would pledge their states' adoption so far as possible to a master set of uniform interstate live stock shipping regulations, to be promulgated jointly by a committee composed of a representative of the U. S. B. A. I. and the non-federal membership of this Association, would be another way that future progress could be made toward this end.

Your committees, that is, the two for whom I am speaking, do have one definite recommendation to make, and that is that for the coming year a single committee be constituted to deal with these matters. It would be our hope and expectation that with the groundwork that has been laid such a committee could submit recommendations for the modification of some of the rules and regulations that would bring about more uniformity and which would be reasonable enough and also stringent enough to be accepted by the live stock sanitary officials with practical unanimity.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ANIMAL INDUSTRY

Summary of State Requirements Governing the Entry of Swine for Purposes Other Than Immediate Slaughter

(Note: Swine shipped for immediate slaughter to a public stockyard or recognized slaughtering center are generally admitted without restriction.)

Affidavit by owner or shipper that swine have not been exposed to cholera:

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<tbody>
<tr>
<td>Colorado</td>
<td>Mississippi</td>
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<tr>
<td>Delaware</td>
<td>Nevada (pure bred only)</td>
</tr>
<tr>
<td>Kansas</td>
<td>Oregon (breeding only)</td>
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</tbody>
</table>
Affidavit by owner or shipper that swine have been inoculated with anti-hog-cholera serum or with serum and virus:

Alabama

Health certificate showing serum or serum and virus treatment*:

*See state regulations for time required to elapse between inoculation and entry into state.

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<tr>
<td>Alaska</td>
<td>Louisiana</td>
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<td>Arizona</td>
<td>Maine</td>
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<td>Arkansas</td>
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<td>Indiana</td>
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<td>Iowa</td>
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<tr>
<td>Kentucky</td>
<td>Pennsylvania</td>
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Oklahoma (special permit may be secured from state to treat at destination)

Veterinary health certificate:

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<tr>
<td>Massachusetts</td>
<td>Wyoming</td>
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<tr>
<td>New Hampshire</td>
<td>Idaho</td>
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<tr>
<td>Rhode Island</td>
<td>(double treatment required if exposed)</td>
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Permit to be secured in advance of shipment from state quarantine offices:

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<tr>
<td>Nevada</td>
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<td>New Mexico</td>
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No specific requirements but freedom from disease and exposure:

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<th>State</th>
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<tr>
<td>New York</td>
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<td>Puerto Rico</td>
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Clean and disinfected crates or vehicles are required in transportation of swine for purposes other than slaughter.

Federal regulations governing the interstate movement of swine require that they be free from infectious, contagious, or communicable disease. (Inspection or certification not required.) Swine from public stockyards if for feeding, breeding or stocking purposes are required to be treated with serum or serum and virus and certified by an inspector of the Bureau of Animal Industry.
JOINT REPORT

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ANIMAL INDUSTRY

Summary of State Regulations Governing the Entry of Horses to Prevent the Spread of Glanders

Mallein Test, Health Certificate, and Special Permit:

Iowa
Minnesota
Rhode Island
Vermont

Mallein Test and Health Certificate:

Hawaii
Idaho
North Dakota
Oregon
Puerto Rico
South Dakota
Utah
Wisconsin

Health Certificate Only:

Alabama
Alaska
Arizona
California
Colorado
Kansas
Kentucky
Louisiana
Michigan
Mississippi
Montana
Nebraska
Nevada
New Hampshire
North Carolina
South Carolina
Tennessee
Texas
Washington
West Virginia
Wyoming

Health Certificate and Permit:

New Mexico

Permit Only:

Maine
Pennsylvania

Mallein Test, Health Certificate, and Permit Not Required:

Arkansas
Connecticut
Delaware
Dist. of Columbia
Florida
Georgia
Illinois
Indiana
Maryland
Massachusetts
Missouri
New Jersey
New York
Ohio
Oklahoma
Virginia

There are no federal regulations governing the interstate shipment of horses to "Prevent the Spread of Glanders" other than that the animals must not be affected with the disease or any other contagious, infectious or communicable disease.
# UNITED STATES DEPARTMENT OF AGRICULTURE

## BUREAU OF ANIMAL INDUSTRY

### Summary of Regulation 4, B. A. I. Order 309, to Prevent the Spread of Scabies in Sheep

#### FEDERAL INTERSTATE REGULATIONS

<table>
<thead>
<tr>
<th>From Quarantined Area</th>
<th>From Free Area</th>
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<tr>
<td></td>
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<tr>
<td><strong>For Slaughter</strong></td>
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<tr>
<td>Inspected and Certified</td>
<td>Inspected and Certified</td>
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<tr>
<td><strong>For other Purposes</strong></td>
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<tr>
<td>Dipped Once and Certified</td>
<td>Dipped twice and Certified</td>
</tr>
</tbody>
</table>

**States Accepting Shipments Without Imposing Restrictions Other Than Those in Federal Regulations**

- Arkansas
- Delaware
- District of Columbia
- Florida
- Georgia
- Hawaii
- Maine
- Maryland
- Massachusetts
- Missouri
- New Jersey
- New York
- Oklahoma
- Puerto Rico
- Vermont
- Connecticut

**Requirements Imposed by States in Addition to Federal Regulations on Shipments of Sheep for Entry**

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(a) Rams only  
(b) If from quarantined area  
(c) From Nebraska only  
(d) If through public stockyards  
(e) Except from scabies-free States  
(f) Except purebred sheep

The only areas in the United States remaining under Federal quarantine for scabies in sheep are:

- In Louisiana: The Parishes of Allen, Beauregard, Calcasieu and Vernon.
- In Mississippi: The Counties of Forrest, George, Greene, Hancock, Harrison, Jackson, Jones, Lamar, Pearl River, Perry, Stone and Wayne, and that portion of Marion County lying east of Pearl River.
UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ANIMAL INDUSTRY

Summary of Regulation 7, B. A. I. Order 309, to Prevent the Spread of TUBERCULOSIS IN CATTLE

FEDERAL INTERSTATE REGULATIONS

From Modified Accredited Areas

- Accredited Herds Cattle
  - Certificates showing cattle originated in such herds.

- Dairy and Breeding Cattle
  - Certificates showing cattle originated in modified accredited area.

- Feeder and Slaughter Cattle
  - Shipped under permit to points under Federal inspection.

- Tuberculous Cattle (reactors)
  - Shipped under permit to points under Federal inspection.

From Nonmodified Accredited Areas

- Certificates showing cattle originated in such herds.

- Tuberculin tests and health certificates.

- Tuberculin tests and health certificates (except slaughter cattle).

- Shipped under permit to points under Federal inspection.

STATES ACCEPTING SHIPMENTS OF CATTLE WITHOUT IMPOSING RESTRICTIONS OTHER THAN FEDERAL REGULATIONS ON SHIPMENT OF CATTLE FOR ENTRY:

- District of Columbia
- Georgia
- Kansas
- Louisiana
- Nebraska
- New Mexico
- North Carolina
- Ohio
- Oklahoma
- Tennessee

REQUIREMENTS IMPOSED BY STATES IN ADDITION TO FEDERAL REGULATIONS ON SHIPMENT OF CATTLE FOR ENTRY:

<table>
<thead>
<tr>
<th>States</th>
<th>A. Dairy and Breeding Cattle from Modified Accredited Areas</th>
<th>B. Health certificate</th>
<th>C. Tuberculin test must have been applied within 1 year</th>
<th>D. Retest at destination</th>
<th>E. Must originate in accredited herd or modified accredited area</th>
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<td>(a) Tuberculin test record</td>
<td>(b) Health certificate</td>
<td>(c) Tuberculin test must have been applied within 1 year</td>
<td>(d) Retest at destination</td>
<td>(e) Must originate in accredited herd or modified accredited area</td>
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<td>(a) Permit must be secured</td>
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<td>(e) Must originate in accredited herd or modified accredited area</td>
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269
### UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ANIMAL INDUSTRY

Summary of State Regulations to Prevent the Introduction of Cattle Infected with Bang's Disease\(^1\)

#### I. GENERAL
1. Health certificate and test made within
   - (a) no specified time
   - (b) 21 days
   - (c) 30 days

2. Permit required
3. Permit required and quarantine and test at destination
4. Cattle under 6 months of age
   - (a) test not required under 5 months of age
   - (b) test not required under 6 months of age

5. Test must be tubemethod
6. Test must be in State laboratory
7. Quarantine on cattle for resale unless from accredited herds
8. Quarantine 60-90 days and retested
9. Reactors not accepted
10. Reactors accepted on permit

#### II. CATTLE ORIGINATING IN ACCREDITED HERDS
1. Herd test within 6 months of shipment
2. Herd test twice in 1 year
3. Herd test within 1 year of shipment
4. Herd test within 1 year and individual test within 90 days of shipment

#### III. BANG’S DISEASE FREE AREA

#### IV. CATTLE ORIGINATING IN HERDS UNDER STATE AND FEDERAL SUPERVISION
1. Negative herd test within 30 days of shipment
2. Negative herd test within 3 months of shipment
3. Negative herd test within 3 months and individual test within 30 days of shipment
4. Negative herd test within 3 months and individual test within 60 days of shipment
5. Two negative tests within 6 months of shipment
6. Negative herd test within 6 months of shipment
7. Negative herd test within 6 months and individual test within 60 days of shipment
8. Two negative tests within 6 months; last within 6 months of shipment

#### V. CATTLE IN HERDS NOT UNDER STATE AND FEDERAL SUPERVISION
1. Negative herd test within 3 months of shipment
2. Female cattle may originate in herds 99% free and pass two clean tests within 90 days, last one of which shall be not longer than 30 days before shipment. Restest within 90 days at destination
3. May originate in herds passing a free test not longer than 6 months before shipment, except bulls, which must pass a test within 60 days before shipment. Restest after destination is reached

#### VI. EXHIBITION CATTLE
1. Accredited herds
2. Bang's disease free herds
3. Bang's disease free herds tested within 90 days of shipment
4. Herds not under supervision tested within 60 days of shipment

#### VII. FEEDER CATTLE
1. Steers exempt
2. Spayed heifers exempt
3. Special quarantine
4. Quarantine and test at destination when facilities not available origin
5. Negative test on female cattle and bulls
6. Bulls—negative test just before entry
7. Females and bulls which are to be spayed or castrated within 10 days exempt

#### VIII. RANGE FEMALE CATTLE OF THE BEEF TYPE
1. No requirement

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**NOTE:** There are no Federal regulations governing the interstate shipment of cattle "To Prevent the Spread of Bang's Disease."

* Does not include regulations governing slaughter cattle.

\(^1\) Denotes exception to 1. of "I. GENERAL."
DR. MILLER: This report has been approved by the Executive Committee. The other, Dr. Axby, I do not think needs any approval. It is more in the nature of a statement. (Applause.)

PRESIDENT AXBY: Thank you Dr. Miller. This has become a national problem. During the last year, by virtue of being your president, I received 28 letters from individuals complaining because of the unfair, as they termed it, regulations, and because of the lack of any semblance of uniformity. Now, I do not know just how much you appreciate how much effort has been put in by this Committee, but, you all must realize, that it is the starting point toward the accomplishment of something that is greatly to be desired.

As recommended to you by Dr. Miller, if each succeeding year gives more time and effort to this problem, I believe the things will be accomplished that the live stock industry wants.

Our job is to take care of the live stock industry with as much uniformity as possible. So Dr. Miller, we again thank you and your respective committees that you represent.

The next report by a committee chairman is the one on resolutions, by Dr. D. M. Campbell, editor of "Veterinary Medicine," Chicago, Illinois.

Dr. Campbell. (Applause.)

REPORT OF COMMITTEE ON RESOLUTIONS

DR. D. M. CAMPBELL, Chairman, Chicago, Illinois

DR. L. A. MERILLAT,
Chicago, Illinois

DR. H. BUSMAN,
Indianapolis, Indiana

RESOLUTION No. 1

WHEREAS: The protection of the live stock industry from loss due to infectious and other diseases of animals is dependent upon the official and private veterinary service available; and

WHEREAS: The veterinary service available to the live stock industry for the control of disease is dependent for its efficiency, among other things, upon adequate authority invested by law in the service, requisite financial support, a trained personnel adequate in number, experienced in the conduct of its work and reasonably secure in official tenure; Therefore

BE IT RESOLVED: That the Committee on Legislation of the United States Live Stock Sanitary Association or a special committee appointed for that purpose be requested to prepare forthwith a plan
for a state animal disease control organization that, when approved by this Association, may be available to state officials having in charge the creation, reorganization or direction of state services for the control of animal diseases; and

BE IT FURTHER RESOLVED: That such plan for the organization of an animal disease control service be made available to members or others interested in improving the live stock sanitary service of their states, and that this Association lend its support and every feasible aid to such persons in improving the protection of the live stock industry of their states.

RESOLUTION No. 2

WHEREAS: The inspection of meat and meat food products by a competent personnel under the direction of the Bureau of Animal Industry, United States Department of Agriculture, has been and is of inestimable benefit to the general public in the protection of human health against diseased or contaminated meat, and has been and is of great economic benefit to producers of live stock in protecting them against the spread and ravages of animal diseases and plagues, and

WHEREAS: This inspection service of the Bureau of Animal Industry, United States Department of Agriculture, extends and covers only approximately 65% of the meat consumed in the United States, and

WHEREAS: A few states and many cities have inaugurated and are maintaining systems of local meat inspection over meats and products not prepared under the supervision of Federal meat inspection, and

WHEREAS: These local systems are not uniform in requirements nor practice, and are often restricted in operation because of political influences, and

WHEREAS: It is a recognized fact that meats prepared without adequate inspection supervision are a menace to public health and need supervision much more than the much larger percentage of meats that come under adequate inspection, and that 25 to 30% of all meats sold to and consumed by the general public has no inspection of any kind; Therefore

BE IT RESOLVED: By the United States Live Stock Sanitary Association that it favors uniform, adequate meat inspection over all meats and meat food products sold to the general public, and that such system should be comparable in all essential details and in personnel to the meat inspection service of the Bureau of Animal Industry, United States Department of Agriculture; and
REPORT OF COMMITTEE ON TICK ERADICATION IN 1939

DR. T. O. BOOTH, Chairman, Fort Worth, Texas

DR. E. P. FLOWER, Baton Rouge, Louisiana

DR. WILLIAM MOORE, Raleigh, North Carolina

DR. I. S. McADORY, Auburn, Alabama

DR. J. M. SUTTON, Atlanta, Georgia

During 1939 tick eradication was continued and progress made in all infested areas in Continental United States and in Puerto Rico, and systematic work was inaugurated in the United States Virgin Islands. The year's activities will result in the release of 7,155 square miles of territory in Florida and Texas, and 1,247 square miles in Puerto Rico, and will reduce the area remaining in quarantine to a little more than one per cent of the original tick infested territory.

This year's annual federal tick fever quarantine order, which will be known as B. A. I. Order 372, will become effective on December 15, 1939. The effect of this order will be as follows:

In Florida: The remainder of Glades and Highlands Counties will be released from quarantine.

In Texas: Angelina, Hardin, Polk, and Shelby Counties and parts of Cameron, Webb, and Zapata Counties will be released from quarantine.

In Puerto Rico: The middle third of the Territory of Puerto Rico will be released from quarantine.

This order will also quarantine a narrow strip of land along the international boundary in Val Verde, Kinney, and Maverick Counties, Texas. This requarantine is necessary in order to better control the movement of straying and smuggled live stock from adjacent tick infested areas in Mexico.

For the records of the Association there is attached a copy of the Bureau of Animal Industry's statement showing progress in tick eradication from July 1, 1906, to December 15, 1939.

PRESIDENT AXBY: All those in favor of the adoption of this report signify by saying, "aye," contrary, "no!" The motion is carried and the report is adopted.

The next committee report is on the Revision of the Constitution and By-Laws. I have the report, and I will read it to you.
### UNITED STATES DEPARTMENT OF AGRICULTURE

Bureau of Animal Industry

Washington, D. C.

Progress in Tick Eradication—July 1, 1906, to December 15, 1939.

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<th>Counties quarantined on Dec. 15, 1939</th>
<th>Counties released to Dec. 15, 1939</th>
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December 15, 1939, 7,155 square miles released.
December 15, 1939, 373 square miles re quarantined.

Territory of Puerto Rico, total area .................. 3,435 square miles
Area released Dec. 1, 1938, 1243 square miles
Area released Dec. 15, 1939, 1247 square miles
2490 square miles 2,490 square miles
Area remaining in quarantine .................. 945 square miles
REPORT OF THE COMMITTEE ON REVISION OF THE CONSTITUTION AND BY-LAWS

DR. MARVIN R. HALE, Chairman, Olympia, Washington
DR. J. V. KNAPP, Tallahassee, Florida
DR. E. A. CROSSMAN, Boston, Massachusetts

Whereas the United States Live Stock Sanitary Association is not at the present time incorporated under the laws of any state, and whereas your committee does not feel that this is consistent with good business practices to conduct such a vast organization as this Association as a free lance body subject to all the vicissitudes of this present-day legal entanglements, we, therefore, recommend that the secretary-treasurer be empowered to employ such assistance as may be deemed necessary for the purpose of incorporating this Association as a non-profit organization.

PRESIDENT AXBY: All those in favor of adopting this report signify by saying aye, contrary no. The motion is carried and the report is adopted.

I now have before me the Report of the Auditing Committee which I will read to you.

REPORT OF THE AUDITING COMMITTEE

E. T. FAULDER, Chairman,
W. H. HENDRICKS H. E. CURRY

We, the Auditing Committee appointed by Vice-President H. D. Port by order of the Executive Committee of the United States Live Stock Sanitary Association, have examined the financial records and letter of certification from the American Surety Company of New York dated August 18, 1939 in possession of Dr. L. A. Merillat and we find:

United States Treasury Bonds to the amount of $5,200.00 and records of cash in bank to the amount of $2,468.58, total $7,668.58; also bond from Western Casualty Company to the amount of $10,000.00 in favor of L. A. Merillat, and we find all financial records in a satisfactory condition.

PRESIDENT AXBY: All those in favor of adopting this report signify by saying aye, contrary no. The motion is carried and the report adopted.

The Report of the Committee on Transmissible Diseases is going to have to be read if it is to get into the printed program. I think it is necessary for me to say that there are a lot of loose ends to watch for in this report. I will read this report because I do want it
in the written proceedings, and I will read it now before adjournment.
It has been approved by all five members of the committee.

REPORT OF THE COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY

DR. ERWIN JUNGHERR, Chairman, Storrs, Connecticut
DR. H. VAN ROEKEL, Amherst, Massachusetts
DR. L. P. DOYLE, Lafayette, Indiana
DR. A. J. DURANT, Columbia, Missouri
DR. J. S. ANDERSON, Lincoln, Nebraska
DR. R. S. ROBINSON, Pierre, South Dakota

The present report of the Committee on Transmissible Diseases of Poultry wishes to follow the precedent set by corresponding reports of the past years, in attempting to summarize the important developments in the field of poultry pathology during the year 1939. Although, by definition, the report is concerned primarily with transmissible diseases of poultry, nutritional disorders must be taken into consideration from the points of view of differential diagnosis from, and predisposing action to, infectious diseases.

Historical Events

Three important historical events have taken place during the past year which will profoundly influence the poultry industry especially in its relationship to poultry health and disease.

The erection and dedication of the U. S. Regional Poultry Research Laboratory at East Lansing, Michigan, for the study of viability of poultry may be considered an intrinsic recognition of the economic importance of poultry disease problems, because it is the first time that a laboratory was dedicated exclusively to the study of poultry diseases. With the cooperation of 25 Northeastern and Northcentral states, the new Regional Laboratory may be looked upon as developing into a productive and stimulating center of poultry disease research.

During the sessions of the Seventh World's Poultry Congress at Cleveland, Ohio, August, 1939, the American Veterinary Medical Association held a special meeting which was a public expression of the interest of the veterinary profession as a whole in poultry disease problems. The meeting was remarkable, because teachers and research workers in the field of veterinary science and federal and state sanitary officials, all of which have been actively engaged in the control of poultry diseases for a number of years, joined with practitioners who have come to realize the opportunities for service offered by the poultry industry.
BE IT FURTHER RESOLVED: That the Committee on Meat and Milk Hygiene is hereby instructed and authorized to use all means at its disposal to encourage all states to adopt and maintain systems of meat inspection for meat and meat products not subject to Federal inspection, similar and equal to that of the meat inspection service of the Bureau of Animal Industry, United States Department of Agriculture.

RESOLUTION No. 3

WHEREAS: The education of the public, the live stock industry and the veterinary service in the matter of live stock sanitation is indispensable to the success of animal disease control; and

WHEREAS: It is important to attain the widest distribution of the splendid discussions on our programs at our annual meetings in appropriate fields; and

WHEREAS: The publication of such discussions in our annual reports limits its distribution and educational value to our own members and a few hundred others; Therefore

BE IT RESOLVED: That our secretary be instructed and directed to make the papers and discussions presented at our annual meetings available to the veterinary press and in appropriate instances, to the agricultural press and to medical and other scientific publications and furnish every facility to such publications to the end that our papers and discussions be as widely published in veterinary, agricultural and public health fields as possible; and

BE IT FURTHER RESOLVED: That those presenting formal papers, committee reports or other discussions on our program be urged to supply the secretary's office with copies of their contributions at least four weeks in advance of the date of the meeting at which they are to be presented to enable the secretary through Science Service to effect a wide distribution of abstracts and briefs of public interest in the daily press.

RESOLUTION No. 4

WHEREAS: Poultry suffer from a number of diseases which impair the quality and engender esthetic objection to the use of poultry products as food, thus in a measure stigmatizing all poultry in the estimation of the general public, and as a consequence, injuring the poultry industry by restricting its market; and

WHEREAS: A proper inspection of live birds and the carcasses at the time they are processed for food, would furnish information of material value in the control of poultry diseases; Therefore
BE IT RESOLVED: That we urge the adoption of legislation and other measures necessary for the Bureau of Animal Industry of the United States Department of Agriculture to offer an anti-mortem and a post mortem inspection of poultry at the time of slaughter comparable to its inspection of other food producing animals, provided that in the beginning such inspection be limited to poultry products other than eggs, entering into interstate commerce, and to poultry processing establishments that make application for such inspection.

Dr. Campbell's prepared reports were regularly seconded and accepted by the Association.

PRESIDENT AXBY: The next report is on "Tick Eradication," by Dr. Booth. Dr. Booth is not present, but he sent in his report which was submitted to the Executive Committee. The report is unanimously signed, and the Executive Committee approved it. I will read it to you.
The beginning of the European war was accompanied by a panicky rise in poultry feed prices, although some adjustments have taken place. However, there is no doubt that price levels will directly influence the modern poultry industry, which has had no previous experience with the economic shock brought about by a major war, since it was comparatively unimportant during the last Great War. Economic conditions always exert a great influence upon organized disease control programs. Efforts should be made to guard against any loss in important ground previously gained in the sanitary control of poultry diseases.

Pullorum Disease

Pullorum disease control under the National Poultry Improvement Plan will form the subject of discussion in a special paper on this program. Attempts to standardize pullorum disease eradication for the entire United States must take into account regional requirements of the poultry industry. However, basic principles for the control, eradication and prevention of diseases should be adopted and conscientiously executed if progress in the combat of pullorum disease is to be anticipated. The Committee recommends that state agencies which exercise regulatory powers over live stock diseases increase their participation in the pullorum disease phase of the National Poultry Improvement Plan. It is gratifying to note that in some states outstanding progress is being made in pullorum disease eradication by the state regulatory agencies.

Paratyphoid

Studies on paratyphoid infections (salmonelloses) in poultry have shown that they may affect a large variety of domesticated and some wild birds especially pigeons, turkeys, chickens, quail and ducks. The causative organisms belong to the genus Salmonella; over 20 different species or types of this bacterial genus have been described in birds, the most important representative of which is Salmonella typhi-murium. Salmonella enteritidis infections have been reported to occur frequently in geese in Europe, but are rare in North America, a fact which probably accounts for the rarity of enteritidis food poisoning in man in this country. The newer studies on paratyphoid infection in birds have brought out the fact that birds must be considered an important natural reservoir of paratyphoid organisms and that the majority of avian paratyphoid strains occur also in association with gastro-enteritic disturbances in man.

The control of avian paratyphoid is difficult; eradication programs based upon the serologic detection of reactors check the disease to a certain extent, especially by increasing the livability of young birds, but are not likely to result in complete eradication of the disease, as
is the case in pullorum disease. General sanitary measures and incubator sanitation to prevent navel infection are important in the control of paratyphoid.

Avian Tuberculosis

The committee wishes to call attention to the recent monograph of Wm. H. Feldman on avian tuberculosis infections, (Williams and Wilkins, Baltimore, Md., 1938), which represents the most comprehensive work on this important subject. The economic importance of the disease can be seen from a statement therein that the United States Poultry Industry with an annual gross value of $2,000,000,000 sustains a loss of $12,000,000 per year from this disease. Probably another equally high live stock loss comes from the dissemination of chicken tuberculosis to swine and other mammals. Avian tuberculosis is especially prevalent in the Northcentral states of this country. In view of its importance, it becomes the duty of every one interested or engaged in live stock sanitary work, to come to a full realization of the problem of avian tuberculosis in its relationship to the general fight against tuberculosis in man and animals.

Protozoan Diseases

The formerly confused concept of flagellate diseases in turkeys has been considerably clarified by Hinshaw and his associates. The upper digestive tract of turkeys is liable to infection with *Trichomonas diversa* (Volkmar and Hawn) said to be identical with *Trichomonas gallinae* (Stabler). A similar infection has recently been described in the chicken (Levine and Brandly). Intestinal trichomonads and certain other intestinal protozoa of turkeys seem to be innocuous, but members of the genus *Hexamita* are considered to be the causative agent of an infectious enteritis in young turkeys (Hinshaw, McNeil and Kofoid).

Virus Disease

The virus of equine encephalomyelitis is recognized now to be, aside from certain mammals and man, also pathogenic to a variety of avian hosts, especially pigeons, pheasants, turkeys, sparrows and others. The virus has been recovered from free-living birds (pigeons, pheasants) and has thereby been shown to find a potential reservoir in birds during interepidemic periods.

Fowl paralysis and allied diseases, often covered by the term leukotic diseases, are recognized as being the most important cause of adult poultry mortality. A visible expression of this general opinion may be found in the fact that the new Regional Poultry Research Laboratory referred to above, has chosen the study of fowl
paralysis and allied diseases as the first problem for a coordinated investigation.

To the study of fowl paralysis four contributions of apparent significance have been made during the past year. First, the work of Blakemore and Dalling has brought forth evidence that fowl paralysis is a strictly infectious disease and causes, in its early manifestations, necrosis of the visceral organs especially of the liver and heart, while the later manifestations corresponding to lymphomatosis of the nervous and visceral organs, represent a final stage of the disease which is often non-transmissible. Secondly, an increased host range was suggested by the demonstration of a fowl paralysis-like disease in pheasants by Jungherr and in turkeys by Andrews. Since both of these avian species are susceptible to equine encephalomyelitis, the differential diagnosis of encephalitic diseases in birds becomes of increasing significance. Thirdly, Durante and McDougle have shown by repeated blood transfusions that the virus of fowl paralysis occurs in the circulating blood of chicks hatched from birds clinically affected with this disease. There were especially 3 age periods during which the blood of the donors readily transmitted the disease namely, around the 25th, 55th and 115th day of life. Fourthly, a new way of attacking the vexed question of etiological interrelationship among the various manifestations of the fowl paralysis complex has been pointed out by the work of Stern and Kirschbaum (Science, 1939, 89:610-611) and by that of Kabat (Jour. Biol. Chem. 1939, 130:143-147) who isolated a complex macromolecular material and a polysaccharide respectively, from diseased tissues of leukosis producing avian viruses. Although these materials are not known to possess pathogenic properties, the isolation of chemical substances suggests that chemical analysis of diseased tissues characteristic for avian leukoses may elucidate the question of interrelationship. Chemical analyses have been applied with great success to the differentiation of phyto-pathologic virus diseases. However, even if the chemical nature of avian viruses should be established, one must be extremely wary of deducing from it the possibility of spontaneous generation of such viruses.

Nutritional Diseases

Marked advance is being made in the chemical recognition of vitamins and thereby the confusing alphabet of vitamins is reduced. Chemical terms for vitamins are preferable in defining deficiency diseases. Of the B complex factors necessary for birds, B1 is now known as thiamin, B2 or G as riboflavin, and the chick antidermatitis factor as pantothenic acid. Some recent evidence suggests that the acrodynia factor B6 of the rat is also necessary for chicks. The anti-encephalomalacic factor preventive of crazy chick disease has been found closely related to, or identical with, vitamin E (alpha-toco-
pherol), and vitamin K, or the blood coagulation factor of man and animals including birds, has recently been synthesized and termed phthiocol.

Attention should also be called to a presumably metabolic disorder of laying birds in the early stages of production which has been observed with increasing frequency in the North Atlantic states. The disease is accompanied by sudden onset, fever, cyanosis and death within a few hours. Pathologically the disease is characterized by yellowish and hemorrhagic punctation of the liver, mucoid enteritis, and subserous hemorrhages of the heart, sternum and mesentery. Histologically, the yellowish areas in the liver correspond to focal necrosis. On the whole the gross pathologic picture strikingly resembles that of fowl cholera and undoubtedly has been mistaken for it. Although the nature of this presumably metabolic disorder is not known, it should be recognized as an entity which so far has not been adequately named from the scientific standpoint, but corresponds to such a variety of popular terms as "pullet disease," "blue comb," "unknown disease," "X disease" and "infectious enteritis." From the standpoint of this report the disease is of interest as a factor which may possibly lead to a false diagnosis of an infectious disease, especially fowl cholera. Bacteriological examination should be capable of clearing up the point.

Comment

The present report is hoped to give an abridged review of our rapidly advancing knowledge in the field of poultry diseases of both infectious and nutritional origin. It also demonstrates the necessity for the live stock sanitarian and for members of the veterinary profession as a whole to keep abreast with these advances if the professional man wishes to play the part which rightfully falls into his province, in the recognition and control of transmissible diseases of poultry. Service to the poultry industry must be the principal aim rather than professional advancement but there is no doubt that such service is worthwhile because the poultry industry has firmly established itself as one of the major branches of agriculture.

Mr. Chairman, this report has been signed by five of the six members of the Committee on Transmissible Diseases of Poultry, but all members have taken cognizance of the contents of this report.

PRESIDENT AXBY: All those in favor of the adoption of this report will signify by saying aye, contrary no. The motion is carried and the report is adopted.

Dr. Records is not here and he mailed in his report. This is the report of the Committee on Miscellaneous Transmissible Diseases. I will read the report so that it can get into the printed record.
The unusually severe epizootic of foot-and-mouth disease in Europe which began in June, 1937, continued to spread the early part of this year, extending into Finland and Norway, although there was a reduction in the total number of infected farms on the continent. At one time Estonia was the only country in Europe that remained free from the disease. However, since last winter conditions in most of the countries have gradually improved, and the total number of infected premises this fall is far below that of a year ago. In France, for example, about 4,000 herds became infected during the last month reported as against 46,000 a year earlier. There has been similar improvement in Belgium, Denmark, Germany, Netherlands, Sweden, and Switzerland. In Italy, Poland, and the Balkan countries conditions remained about the same. In Great Britain, Denmark, and Sweden only occasional cases are appearing. The latter country hopes shortly to complete eradication. Finland, Latvia, Lithuania, and Norway were successful in eradicating the disease and are now, together with Estonia, the only countries in Europe entirely free.

The Union of South Africa has taken heroic measures to eliminate the infection, but occasional cases have continued to appear. There has been no change in the situation in the rest of Africa or in Asiatic countries, in all of which, except Japan, infection is reported from time to time. In South America the disease has prevailed to about the same extent as in previous years in all of the countries of the continent except Colombia, Venezuela, and the Guianas which, so far as it has been possible to determine, have remained entirely free.

All countries of North and Central America and the West Indies fortunately have continued to enjoy freedom from foot-and-mouth disease. Australia and New Zealand also continue to be free.

As far as we have learned, no new transmissible diseases have been introduced into the North American continent from other parts of the world during the current year. Of the transmissible diseases properly coming within the scope of this report, none appear to have caused spectacular or alarming losses. Developments in connection with equine encephalomyelitis are being covered in detail in a special paper which is being offered as a part of the report of this committee.
Anthrax

Anthrax has been rather troublesome in part of the Pacific Coast and Intermountain areas. While no severe widespread losses appear to have occurred, the disease has characterized itself during the current year by a tendency to appear where not previously identified or where it has been quiescent for a long period of years. Losses also continued rather later in the fall season than usual. In one of the North Central states a disquieting condition appeared in that while the disease was reported as occurring on only eight farms, there were two confirmed human cases with one death and another strongly suspicious case. All of these human cases apparently developed in connection with the skinning of carcasses. It seems well to again stress in this connection the importance of education as to the hazards connected with the improper handling of carcasses of animals until the presence of infections apt to involve human beings can be excluded.

Bacillary Hemoglobinuria

Bacillary hemoglobinuria, sometimes referred to in localities where it is common as red water disease of cattle, an acute condition due to infection with Clostridium hemolyticum, has been attracting some increased attention. Previously definitely identified only in California, Oregon, and Nevada, the presence of this disease was definitely confirmed by bacteriological means in Louisiana in 1937. Since then its presence has also been strongly suspected in Florida, though not as yet so far as we know definitely confirmed. It is suggested, therefore, that livestock sanitarians familiarize themselves with this condition and be on the watch for it in areas where its presence has not been previously confirmed.

PRESIDENT AXBY: This has been referred to and has been approved by the Executive Committee. All those in favor of its adoption signify by saying aye, contrary no. The motion is carried and the report is adopted.

If there is no objection, we will stand adjourned until 1:30 p.m.

The meeting adjourned at 12:10 p.m.

FRIDAY AFTERNOON SESSION
DECEMBER 8, 1939

The meeting convened at 1:55 p.m., President Axby presiding.

PRESIDENT AXBY: The meeting will please come to order. We just have the committee reports and the other unfinished and regular business to transact.
The first committee report is on "Poultry and Rabbit Meat Inspection. Dr. Hurt is not present, but the committee report will be read by Dr. Healy.

DR. J. S. HEALY: As your chairman explained, because of the unavoidable absence of Dr. Hurt, he requested me to read this report.

REPORT OF SPECIAL COMMITTEE ON POULTRY AND RABBIT MEAT INSPECTION

DR. L. M. HURT, Chairman, Los Angeles, California
DR. R. S. GOING, Montpelier, Vermont
DR. F. L. SCHNEIDER, Albuquerque, New Mexico
DR. J. S. HEALY, Madison, Wisconsin
DR. E. S. BRASHIER, Jackson, Mississippi

The ground work for poultry and rabbit meat inspection is already laid. In the year 1928 the United States Bureau of Agricultural Economics was called by the City of New York to lend assistance in the classification for release of cold storage birds in large numbers. Members of this Association have been fortunate indeed in having heard Dr. C. E. Edmunds, supervising inspector, Division of Dressed Poultry Inspection, Dr. Mericle, and others in his Division on several occasions, when the history and nature of this work was presented and progress was reviewed. We regard this as being the best possible source of information upon this important work, and believe that wider publicity should be given such reports on account of their consumer educational value.

The importance of the work was early appreciated, and that Bureau has been called upon for services of this kind in increasing amount from year to year until at the present time.* Approximately thirty-seven veterinarians and ten trained lay inspectors are employed in the administration and supervision of poultry inspection.* In 1934 or soon after the development of quick freeze methods for use in cold storage of meats, vegetables, etc., experiments were made in complete dressing of fowl. The success of this method was apparently assured when the greatly improved package was offered for sale to the public. Inspection of birds for diseases and conditions rendering them unfit for human consumption was then rendered possible and practicable. Internal organs were thus made available for examination which up to that time were left in the viscera until the bird was drawn, either on the bench of the retailer or in the kitchen of the consumer.

* Dr. Slocum: "Approximately because some of our work is seasonal in character and the number of veterinarians, and laymen required varies from time to time." (Letter of 11-28-39.)
A survey of the arguments advanced for and against the general use of veterinary inspection of poultry and rabbit carcasses brings out very few against and a great many of them in favor of such a practice. Those against are very largely under the heading of practicability of the idea and extent to which it may be applied.

During the year this committee has forwarded questionnaires to officials responsible for meat inspection and to some persons prominently connected with the poultry and rabbit industries in every state in the Union. The first and last questions dealt largely with the amount of poultry and rabbit packing now carried on and names of firms engaged in the industry. A digest of the answers received to the other questions has been prepared:

Could the business of poultry and rabbit dressing be centralized for purpose of inspection?

Opinion is varied as to practicability of centralizing slaughtering for inspection. The consensus seems to be that while this might be possible to some extent in some localities it would be generally difficult to accomplish, due to distance between points where the facilities are available. The objections of small producers and retailers are likely to play a part.

What difficulties might be encountered in establishing adequate inspection?

The following seem to be the chief difficulties, which are listed in the order of their importance.

1. Expense attached to changes in equipment and plant management:
   Too many places would make the cost excessive although a large cooperative plan developed in the State of Washington looks feasible. They collect and dress poultry at several points in the state, and ship at low temperature to a central plant where grading and complete dressing is performed under inspection.

2. Trade resistance due to lack of education of the public which is accustomed to the generally established practice of small butchers buying live poultry and killing as they sell. Consumers should be easily convinced of the saving in weight of completely dressed and drawn products, and the safety and wholesomeness assured by proper inspection.

3. Several answers suggested working toward making compulsory the inspection of dressed poultry and rabbit meats prepared for interstate trade.

4. A legal foundation is necessary in most states.
What agencies are available for responsibility for inspection?

All of these are mentioned:


Federal Bureaus of Agricultural Economics and Animal Industry.

County and municipal authorities.

These answers were apparently influenced by the methods of inspection in their respective communities. Most of the states in question seem to have state bureaus or boards which could supervise the inspection. However a surprisingly large number favor a federal bureau as the proper authority to assume control of this work.

Opinion on kind and completeness of inspection which should be provided?

The vast majority of the replies states that both ante and post mortem inspections should be employed. Most opinions would indicate that the inspection should be complete, as in the present federal meat inspection of other meats.

Should the cost of the inspection be borne by the industry or by the public as a health protection measure?

Almost all opinions are in favor of the public bearing the expense. Some correspondents believe that in any case the cost would reflect to the consumer, whether the inspection is supported by the packers, or by the governmental subdivisions responsible for its enforcement.

A wide gap separates the farm and market dressing of meats, and their preparation for sale with the facilities and equipment utilized by the large poultry and rabbit packing companies. In rural communities practically the same practices have prevailed for forty years, and it is quite probable that the practical application of any suggestions that may grow out of the consideration of poultry and rabbit meat inspection by this committee will be limited to districts wherein large numbers of rabbits and birds are available, and those centers of production in which they are prepared and sold in quantities through the established channels of trade. It is likewise quite probable that increased demands for the improved appearance of carcasses will justify considerable increases in equipment and further development of improved methods of preparation in these centers by firms engaged in the preparation and distribution of poultry and rabbit meats.

Our Survey to date brings out the following which has a distinct bearing upon any plan to extend inspection. Producers of poultry
and rabbits for table use have been very tardy to avail themselves of the experience gained in the marketing of other agricultural commodities. They hold association meetings in which the best advice is sought on production problems; they study genetics and food values in order to produce more and larger eggs with increased hatchability and greater livability of chicks; they subscribe for journals and provide themselves with books and publications containing information of value upon husbandry and marketing of their animals and birds but when it comes time to sell, they continue in the time-worn custom of disposing of their stock to dealers and hucksters at prices oftentimes considerably under the actual value which packers, distributors and consumers are willing to pay. It seems reasonable to believe that development of suitable sales agencies conducted by the poultry and rabbit meat industries should bring about a closer relationship between producers and distributors, to their mutual benefit. Packers are willing to bridge this gap if and when they can deal with responsible groups and organizations representing poultry and rabbits in sufficient numbers to justify the expense of special plants and equipment.

We now have on the market poultry and rabbits prepared under two extremes—the country home and market-dressed meat on the one hand, and that from the specially constructed plants which are carefully inspected and splendidly equipped for the rapid preparation of rabbits and fowl on the other. Between the two we may continue for the same time to find all manner and kinds of plants and facilities, but we may reasonably expect to observe the same plant specialization for handling these products that has developed during our own times for the preparation of beef, pork, and mutton.

Consumers of meats in America are used to inspection. They take it as a matter of course, expect it, and are generally appreciative of the protection which it affords them. It is not at all unlikely that the demand for extension of inspection to cover all meats offered for sale through the usual channels of trade will originate among the consumers. It should not take much education to bring that about and therefore the producers, packers, and handlers of poultry and rabbit meats who are themselves cognizant of the benefits of inspection of beef, pork and mutton should take a safe lead in providing the same protection to the public against the sale of diseased or otherwise unfit rabbit or fowl.

These meats will not be listed in the dietary of the average household as staples for a long time. In the meanwhile, they will be classed as occasional or varietal meats which in many cases will be considered delicacies and luxuries. The receipt of an unattractive carcass from a market, or one showing visible changes in the viscera which might suggest that the bird or animal was not healthy, or
even a purchase which was attractive and apparently in nice condition but the eating of which is followed by digestive disturbances among some members of the family may turn the housewife against poultry and/or rabbits for weeks or months.

With these things in mind your Committee believes that the several branches of poultry and rabbit industries—especially the producers should be made fully acquainted with and frequently reminded of the opportunity which is theirs to improve the form in which their products reach the consumer. They must insure the keeping qualities of the meats, add to the attractiveness of the packages and last but still more important—deliver a rabbit or bird which has been prepared for human consumption with all the care and under the same thorough inspection that supervises the preparation of all other meats for our American tables at the present time.

The Committee has reviewed quite a number of articles bearing upon the preparation and storage of poultry and rabbit meat, written by persons engaged in or intimately connected with this industry and refrigeration. These indicate very clearly a deep interest in and a tendency toward adoption of improved methods of preparation, including complete drawing and quick freezing of all such meats. A digest of this material is submitted with—and as a part of—this report for the purpose of acquainting those who may succeed the present committee with the sentiment existing at present among leaders of poultry packers and processors.

The Committee recommends the following:

That the members of the United States Live Stock Sanitary Association avail themselves of every opportunity to encourage poultrymen in their efforts to secure state legislation covering market grades and classification of poultry and rabbit meats. Producers are thus enabled to establish and control improved market conditions, and their activity in so doing makes them more and more conscious of the necessity of complete dressing of their produce under proper inspection.

That the materials, data and information gathered by this Special Committee be submitted to the Committee on Milk and Meat Hygiene with the recommendation that "The Inspection of Poultry and Rabbit Meat" be given suitable space among the several subjects treated in their work.

That this report be considered a final report of the Special Committee on Inspection of Poultry and Rabbit Meats and that the Committee be discharged.
NOTES TAKEN FROM VARIOUS PUBLICATIONS ON FULL
DRAWN AND QUICK FROZEN POULTRY

The United States Egg and Poultry Journal of August, 1937, carries
some good editorial and packer comments on "quick freezing,"
collected during the Spring meeting of the American Society of
Refrigeration Engineers.

"A review of literature naturally introduces little new to science,
but to poultrymen—those engaged in, connected with, or highly inter-
ested in our industry and who are now giving a lot of attention to
problems connected with the marketing of poultry and rabbits—a
review of literature gives many an approach to the study. There are
many facts known to individuals especially to old operators handling
poultry which are not found in current or technical literature. They
would be difficult to report because the methods followed in experi-
ence are not scientific. They are nevertheless important. It is
appropriate in a study of this kind to give prominence to the experi-
ence of those who have done the pioneer work in complete dressing
and rapid freezing, and who know that their product is good."

"Complete drawing and quick freezing has introduced operations
into packing houses radically different from the old order. It is the
opinion of one of the best informed distributors of such products
that it should not be developed too rapidly. It requires more skill,
facilities, and attention to detail then many packers are able or
willing to devote to the project. Problems of preparation, distribu-
tion and customers reaction must be worked out slowly and carefully
in order that we may be sure that only good poultry and rabbits are
delivered to the consumer."

"Any attempt to promote a country-wide demand for their distribu-
tion before proper factories could be established, personnel trained
to intelligently handle them so that the product would not fail to
meet the approval of the consumer would likely be followed by a
repercussion that would set the whole business back for years."
(We find this statement true and it applies equally well to our
interest as sanitarians, since the number of men available who are
competent to properly supervise the complete dressing of poultry and
rabbits is very limited.)

One of the best comments that we have noted in the current
literature and which covers the whole idea of complete dressing
very nicely is that of Robert R. Slocum, Senior Marketing Specialist
in the United States Bureau of Agricultural Economics. "The devel-
op ing and extension of marketing of full dressed and quick frozen
poultry (and rabbits) is desirable. Not only is this a convenience to
the users of the poultry and rabbit but it seems that under normal
circumstances it is more than probable that dressing of such food
animals at the packing plant would be more satisfactorily done and
under more sanitary conditions than when they are drawn for the
consumer in the retail butcher shop. I would also suppose that every-
th ing being considered the dressing of poultry and rabbits could be
done more cheaply at the packing plant than in the terminal market."

"It also occurs to me that there should be considerable saving in
transportation and storage because of the saving in weight and also
because of the smaller space that would be taken in packing a given
quantity of chickens (and rabbits) for storage or shipment. Full
dressing of poultry (and rabbits) also affects the appearance for
packing in attractive consumer packages and this I believe possesses distinct sales advantage."

"At the present time one of the difficulties is to get the housewife to realize that the higher price per pound which is necessary for full dressed poultry and rabbits does not mean more expensive intrinsically. To overcome this point may take some effort but it is by no means an unsurmountable obstacle."

"Among the advantages observed by packers for quick freezing:

1. Poultry is lighter colored than when slow frozen.

2. Reduction in the number of birds which show marks of "freezer burn"—the so-called pock marked bird.

3. Bacterial action and changes attributed to it are arrested more quickly, giving more certainty in control.

"Quick freezing and full dressing of poultry became associated by reason of the fact that a successful application of quick freezing was first made upon dressed birds. Previous to that time large quantities of poultry had been dressed at packing plants and frozen by methods called slow. They still are. In the public mind prejudices against frozen fruits, vegetables and meats has been successfully broken down by the satisfaction given by a certain brand that controls one of the methods of quick freezing."

August and September issues of the United States Egg and Poultry Journal carry excellent articles on quick freezing of poultry. They are prepared by the Editor apparently at the request of Mr. W. F. S. White, president of American Poultry Institute (1937). The conclusion contained and included a digest of the sum of knowledge of quick freezing as it is developed to date and applied in the procedure of poultry preparation and storage (150 publications and several hundred articles were selected by him for this review).

"Quick freezing of poultry is commonly thought to be a proven art. Its adoption by the Industry is said to wait only on public acceptance of frozen products. Valuable though the studies are it is much too strong a statement to say that the art of freezing and handling quick frozen products has been perfected. . . . Some of the processes of quick freezing have not been fully developed for application to poultry and rabbits."

"Technicians and scientists have not had sufficient time and opportunities to develop essential facts about quick freezing as applicable to poultry and rabbits. Furthermore there is not the necessary agreement among operators as to advantages and limitations of the whole business on which to predicate a mechanical program. In the absence of authentic factual knowledge beginners will encounter pitfalls, consequently operators are exhibiting understandable caution. Lack of proven methods and procurement no doubt explains reluctance of some operators to take a plunge into a method of handling of poultry that is thought to be 'just around the corner.' Until a lot of questions may be answered on the basis of experience, they are not going to risk their main business on a revolutionary mechanical program."

This conclusion is particularly applicable to the subject that we are studying, e.g., Poultry and Rabbits. The ideal order to follow in preparation of such meats seems to be—
1. To draw the bird or rabbit as quickly as possible after killing and before rigor mortis sets in.

2. Probably to let it hang at near freezing temperature for a short (but undetermined) period for tenderizing.

3. To package and quick freeze.

4. To hold in a temperature approximately that used to produce freezing until sold.

5. If the bird is to be held long in storage, the temperature shall be kept as uniform as possible to reduce the changes in color, flavor and moisture content that takes place in that time. The rate of change depends upon both the constancy and degree of low temperature maintained.

"We want quick freezing to win favor consistently on the market if for no other reason than that it is a way of delivering the birds to the kitchen in the best condition for cooking—an economical way and a sanitary one if rightly done. Drawing and quick freezing of all poultry (and rabbit) upon killing will substantially eliminate from consideration its sanitary condition—a consideration which is at present an important determining factor of its market value."

"The dressing of poultry (and rabbits) at central packing plants will necessitate government inspection and certification. This will supply long needed data on which to proceed to fight the waste and loss due to diseases which cause the high mortality on farms and in feeding stations. The industry is largely guessing today about the extent and character of poultry diseases."

"Among the things to be studied are—

1. The advisability of eviscerating immediately after killing and the advantages if any of holding the birds a while before freezing.

2. Economical disposal of by-products of full dressed poultry."

IMMEDIATE EVISCERATION:

"The importance of immediate evisceration has—we think—been established as a safety devise from several angles. Quick removal of entrails may even be necessary in birds wrongly fed (as in those which contain fish, in the handling of which all available labor is immediately employed in getting rid of entrails as fast as humanly possible). Poultry when properly conditioned, and quickly cooled, may be safely stored without being drawn, as everyone knows; but to purchase dressed poultry for drawing sometime after killing, unless it has been carried in the meantime at relatively low temperature would seem to be in the light of known facts a risky procedure. It is very likely to lead to trouble if the birds are improperly fed. Be that as it may, they are also handled in a way to transmit to the flesh any undesirable quality of the feed residue in the digestive system, a practice sometimes resulting in a bird that is offensive and inedible. The practical conclusion would seem to be that drawing or quick freezing or both should be done at the point of killing. This is the preferred practice and aim of those who are developing the art as applied to other products."
"A possibility worth investigating is to kill and draw at one plant with carefully timed and conducted shipments of the birds unfrozen during the period of tenderizing to a central plant for grading, packing and freezing."

**BY-PRODUCTS:**

"Entrails when removed present an important salvage product that has not been investigated. They are now almost entirely waste products... The total volume of poultry dressed in the United States is approximately one billion pounds (live weight) annually. Weight of entrails exclusive of hearts and livers is approximately 19% of live weight of heavy and 22% of light breeds and small birds. Feathers which are largely waste constitute about 5% of live weight. They constitute a salvage problem of undrawn as well as drawn poultry. The waste offal and feathers together comprise by weight from 12,000 to 13,000 tons—a fit subject for research."

"Endocrines are useful. Some investigations are under way by the Institute of American Poultry Industry in cooperation with the University of Chicago into the potency and cost of recovery of the endocrines. These are used as a source for obtaining hormones. They include the pituitary, thyroid gland, parathyroid, adrenals, gonads, and possibly the liver which has been recently included in the investigation as a source of hormones.

The glands of the heavy live stock are of sufficient medical importance to constitute a salvaging factor for the packers. The size of the animals does not indicate their value. A sheep pituitary may have the same value as that from a steer, and maybe more. Until the potency of the endocrines of poultry and rabbits has been determined physiologically, that is, by the use of experimental animals, and until their cost of recovery has been determined no estimation of value by salvage, if any, can be made. Heads, feet, and bones may have special uses—some of them medicinal."

**WASTE ELIMINATION:**

"Waste elimination should be and must be a cardinal principle with each industry that expects to keep ahead of the times. Improvement is the order of our age. New ideas account for all advancement in civilization. Here is a new idea in the preparation of dressing poultry—ready to cook, with all the natural fine flavor sealed into the package at its height of flavor. The preparation in a suitable operating room equipped with modern sanitary facilities and manned by expert operators schooled in their respective performances clearly spells efficient workmanship and superiority of products; a finished article ready to go to the kitchen."

**A BIG PROBLEM:**

"There is a big problem in the general adjustment of this process (drawing and quick freezing) to the preparation of poultry ready to cook, delivered to the kitchen in a neat package with absolute insurance of quality and condition, each bird bearing the packers name, net weight of bird, its kind and indicating suitability for, or purpose, in cooking. One problem is to instruct the customer that there is actual saving in buying the packaged article of increased quality poultry in this style of preparation, and that the practical test is in
the eating. The difference in price per pound for the fully dressed,
drawn, ready to cook chickens, minus head, feet and entrails, is a
minor problem, and one that most people see through without much
persuasion."

He urges arousal of interest in bringing about a better way of
marketing dressed poultry than is now the conventional style and since
"it seems to me when we stop to think of it that poultry, of all farm
animals, is the only one to go on the market in an unsightly, insanitary
and inconvenient manner."

W. T. L. White, of Sherman, White & Company, Ft. Wayne,
Indiana, says:

"It has been demonstrated that hard chilling or freezing poultry
does not injure it, and does insure prime condition in handling from
packing plants to distant markets. Quick freezing with entrails
intact would seem to be one safeguard against risk of 'off flavor'
arising from the entrails. If such birds are promptly drawn on
thawing and promptly refrozen (one only) the risk of damage is
probably small."

AND UPON FULL DRAWN AND QUICK FREEZE METHOD:

"A further movement and one which appears to be a logical and
economical step is the method of full drawn "quick frozen" poultry. Our
firm (Sherman, White & Company) has made an arrangement
with the Bird's Eye people for packing poultry at its Fort Wayne
Plant by the Bird's Eye patented method of quick freezing. The
packing season begins in June with broilers and runs through until
Christmas time on various sizes of chickens, fowl, ducks and turkeys.
It does appear that full dressing (evisceration) of poultry and the
quick freezing of it immediately after it is dressed is the next real
advancement of great importance that can likely be made in solving
the problem of marketing dressed poultry."

Clarence Birdseye Refrigerating Data Book—1935: "In order to
lessen the excessive leakage characteristic of slow freezing meats it is
essential that they be thawed slowly in order that the damaged tissue
may reabsorb a part of the water resulting from the melting of the
large ice crystals. . . . No precautions are necessary in thawing quick
freezing meats, for when the minute ice crystals are thawed the
water is readily reabsorbed by the comparatively undamaged tissues.
Thus quick freezing food, whether of plant or animal origin, may be
put on to cook while still frozen."

Explanation of above may be seen in the following extract from a
letter of R. A. Gorton, University of Minnesota. . . . "I have considered
at some length the problems of the state of water in the albuminous
colloids Lloyd & Moran in Proceedings of Royal Society, 147-582
(1934) found that none of the water in a 66% gelatin Gel is frozen
at a temperature above -100° C (-148° F). If that be true for
gelatin Gel, I think it is self evident that at least a part of the water
in muscle tissue remains unfrozen under the same condition of quick
freezing, and in my own mind I believe that it is maintaining the
proper balance between free and bound water which differentiates
between the quick freezing method and the usual slow freezing
processes. This is the probable answer to the differences which are
actually observed in the quality of the products." Signed R. A.
Gorton, chief of Agricultural Biochemics, University of Minnesota.
The "Washcoegg" of September, 1938, carries a good story on the progress in Poultry Meat preparation in the Northwest. The Washington Cooperative Poultry Association has added a cannery to their Seattle Plant and are marketing some full drawn birds. All canned and drawn birds are inspected by Bureau of Agricultural Economic representatives, and demand for the full drawn and individually packed poultry meats, either whole or cut, is increasing rapidly. This Association absorbs the poultry of all members throughout the year, and by selling it on a company or cooperative basis is able to receive good returns for their birds. They maintain receiving plants at points of vantage for their members. Some of their poultry is dressed, chilled and shipped to the main plant at Seattle, where it may be regraded, drawn and frozen, or packed as N. Y. dressed fowl for shipment. The period of time required for shipment to the main plant apparently serves very satisfactorily as a "tenderizing" period. Grading is so uniform in the several killing plants that seldom is it necessary to "regrade" at point of destination. They also sell some of their turkeys as completely drawn birds in individual packages.

The article below recently appeared in the Rabbit Monthly Magazine. Lloyd L. Hirleman, president of the California State Rabbit Breeders Association, is quoted as saying in part as follows:

"BREEDERS please don't give up your start: Press on until you can stamp your Fryers and Hides with the State Association Stamp and sell them to the WORLD.

Let's Have Government Inspection.

Beef, Pork, Lamb and other meats are inspected by the United States Government.

Before they are sold for human consumption the "United States Inspected" stamp goes on them.

The purchaser can buy these products unhesitatingly for he knows that the Government has approved the methods of production, and certified to their freedom from disease.

It's different with rabbits. There is no such thing as inspection and, in many instances, anything goes.

Unscrupulous individuals, and that includes some butcher distributors, can, and do sell old worn out, broken down, tough fibered does and bucks and poor, scrawny, slow grown fryers, as well as some which are not exactly what you would consider healthy.

As a result many housewives refuse to buy rabbits in a public market and you can't blame them.

They go to some rabbit grower and ask to have a rabbit killed especially for them.

The present system is all wrong and it hurts the rabbit business.

We're for Government Inspection of rabbits as well as for other kinds of meat and every conscientious person should strive to bring it about."

DR. WESTMORLAND: I move the adoption of this report. The motion was regularly seconded.
PRESIDENT AXBY: All those in favor of the motion signify by saying aye, contrary no. The motion is carried and the report is adopted.

The next report is the one on legislation. Dr. Curry is the chairman, and he asked me to read it, which I will.

REPORT OF THE COMMITTEE ON LEGISLATION

DR. H. E. CURRY, Chairman, Jefferson City, Missouri
DR. CHARLES E. COTTON, St. Paul, Minnesota
DR. E. T. FAULDER, Albany, New York
MR. WILL J. MILLER, Topeka, Kansas
MR. JOHN P. STOUT, Springfield, Illinois

Your Committee on Legislation has attempted to collect information concerning new legislation pertaining to the control and eradication of contagious, infectious or communicable diseases of livestock during the present year. We find that new laws were enacted in Illinois, Ohio, Kansas, Nebraska, Missouri and Minnesota, pertaining to the control and eradication of Bang's disease.

Tennessee promulgated a new order requiring that all dogs shipped into that state shall be accompanied by an official health certificate, showing that the animal has been vaccinated with anti-Rabies vaccine, thirty days prior to date of importation, and the Rabies vaccine must be administered by an accredited veterinarian.

In a few states, the laws, rules and regulations applying to the operation of community auction sales, have been improved by amendments. However, there still remains an urgent need for more effective control over animals passing through these sales.

We find that the legislators in General Assemblies of thirty-five states appropriated money for the carrying on of cooperative Bang's disease control and eradication program with the United States Bureau of Animal Industry, the amount of money appropriated varying from $1,500.00 to $900,000.00. Therefore, it appears that unless Congress can be induced to eliminate the provision requiring states to match federal funds for the paying of indemnity on Bang's reactors much of the progress made to date may be lost.

Your Committee recommends that all states be urged to appropriate funds for the control and eradication of Bang's disease in cooperation with the United States Bureau of Animal Industry.

We again submit, for your consideration, the following, from the committee report of last year (1938):
"For a number of years this Association has endeavored to have regulatory officials of all states adopt uniform rules and regulations governing the interstate movement of live stock.

"We have repeatedly requested the Secretary of the United States Department of Agriculture to adopt regulations controlling the movement of live stock interstate. We realize that because conditions differ in the various parts of the country, it was impracticable for the Secretary to adopt a regulation that would be acceptable and include requirements to meet the conditions in the various parts of the country.

"In 1919, the Secretary of the United States Department of Agriculture adopted Regulation 7, providing for the inspection and issuance of health certificates for cattle to be moved interstate for the control of tuberculosis. Since 1934 the Federal Government has spent large sums of money in cooperation with the various states in the control and elimination of Bang's disease. Practically every state in the Union now has regulations pertaining to the inspection and certification of cattle in controlling Bang's disease. These regulations are not uniform.

"The Committee recommends that the Association request the Secretary of the United States Department of Agriculture to promulgate and adopt a regulation governing the interstate movement of live stock for the control of Bang's disease."

The laws, rules, and regulations enacted by the several states relating to shipments of live stock have been presented for discussion at various meetings of the National Council of State Governments, organized for the purpose of making a study and survey of Trade Barriers in restraint of trade between the states.

We recommend that the Secretary of this Association be instructed to contact Executive Director Frank Bane, National Council of State Governments, 1313 East 60th Street, Chicago, Illinois, and offer the cooperation of this Association; and further, that our Secretary arrange to attend all future meetings of the National Council of State Governments and report to members of the Executive Committee of this Association any and all action that may be taken regarding laws, rules and regulations pertaining to the interstate movement of live stock.

PRESIDENT AXBY: This report has been approved by the Executive Committee and is now ready for adoption.

DR. WESTMORLAND: I move the adoption of this report. The motion was regularly seconded.
PRESIDENT AXBY: It has been moved and seconded that the report be adopted. All those in favor of the motion signify by saying, aye, contrary no. The motion is carried and the report adopted.

The next committee report is the one on Policy by W. J. Butler.

DR. W. J. BUTLER: Mr. President, members of the United States Live Stock Sanitary Association: The report of your Committee on Policy is very short. As you realize, many of the items that may be listed under policy, have been taken care of in previous committee reports.

REPORT OF THE COMMITTEE ON POLICY

DR. W. J. BUTLER, Chairman, Helena, Montana

DR. R. W. SMITH, Concord, New Hampshire

MR. H. R. SMITH, Chicago, Illinois

DR. JOHN R. MOHLER, Washington, D. C.

DR. D. E. WESTMORLAND, Frankfort, Kentucky

Your Committee on Policy desires to highly commend the United States Bureau of Animal Industry for preparing and furnishing B. abortus antigen to the various states for official testing for Bang's disease.

We call the attention of the live stock sanitary officials to the desirability of coordinating the meat inspection findings with control measures for the eradication of live stock diseases. We are of the opinion that as a profession we are losing a golden opportunity by not reporting disease conditions found upon post mortem inspection to regulatory authorities. A definite coordinating reporting system inaugurated wherever feasible would disclose foci of infection that go undetected by regulatory officials. The inauguration of such a system is a splendid opportunity for the veterinary profession of the United States to establish a system of disease control that would not be equalled by any other profession or country.

We move that such a policy be approved by the United States Live Stock Sanitary Association and presented to federal and state regulatory officials for their earnest consideration.

We again recommend that the United States Live Stock Sanitary Association request the United States Bureau of Animal Industry to establish the publication of a monthly news letter in which is given the cross-section of the disease situation of the various states in the United States as well as in foreign countries.

We deplore the lack of harmony in interstate regulations governing the movement of live stock and particularly cattle from accredited
areas. We move that the United States Live Stock Sanitary Association make every effort to have State regulations coordinate so that there will be uniformity and a just recognition of the excellent work done by federal and state live stock sanitary officials in the control of bovine tuberculosis and the establishment of modified accredited tuberculosis free areas. We suggest that United States Bureau of Animal Industry regulations be used as a basic standard for state regulations.

Your Committee realizes the value of blood testing, segregation, and slaughter for the control and eradication of Bang's disease. However, we desire to call attention to the members of the United States Live Stock Sanitary Association that every effort should be made to devise a more scientific method for controlling and eradicating Bang's disease. Experience has proved that proper herd management, together with calfhood vaccination is a desirable method of control and ultimate eradication of Bang's disease under range and semi-range conditions.

We move that it be the policy of the United States Live Stock Sanitary Association to request the United States Bureau of Animal Industry and interested state experimental stations to establish projects for further study of methods for the control and eradication of Bang's disease and to petition Congress that adequate funds be appropriated to the United States Bureau of Animal Industry for the carrying on of such research work.

DR. BUTLER: Mr. President, inasmuch as this report has been referred to the Executive Committee, I move the adoption of the report. The motion was regularly seconded.

PRESIDENT AXBY: All those in favor of the motion signify by saying aye, contrary no. The motion is carried and the report is adopted.

The next report is on "Tuberculosis," which will be read by Dr. Boyd.

REPORT OF THE COMMITTEE ON TUBERCULOSIS

DR. C. U. DUCKWORTH, Chairman, Sacramento, California

DR. A. E. WIGHT, Washington, D. C.

DR. E. T. FAULDER, Albany, New York

DR. D. H. RICKS, Oklahoma City, Oklahoma

DR. A. E. CAMERON, Ottawa, Ontario, Canada

DR. H. A. SEIDELL, Des Moines, Iowa

Your Committee on Tuberculosis is now privileged to report the fact to this Association that the last herd of cattle in the United
States, so long sought for in the cooperative tuberculosis eradication campaign has been officially tuberculin tested and it now appears probable that the remaining six non-accredited counties in the United States will be placed in a modified accredited status during the next year.

In view of this gratifying prospect, a new situation is presented which will necessitate some changes in the regulations governing this work. Therefore, it is respectfully suggested that the Committee on Tuberculosis during the coming year be instructed to study the conditions now confronted, for the purpose of revising the uniform methods, rules and regulations, to meet the needs resulting from changes created by this situation and present same for consideration by this body at its next regular session.

Some revision of regulations governing the movement of cattle in interstate commerce may also be necessary and desirable.

It is also recommended that regulatory officials in each state revise their regulations for the purpose of effecting such similar changes as may be required.

Your committee is of the opinion that the study of skin lesions and related problems should be continued in addition to the question of avian tuberculosis and its potentialities with respect to cattle.

While tuberculosis in cattle has been minimized as a result of the drastic measures instituted in an endeavor to eradicate the disease during the past twenty-two years, effort necessarily required to prevent its recurrence must not be minimized.

Therefore, your committee desires to reiterate the recommendations presented in previous reports by the Committee on Tuberculosis in recent years which pertains to the importance and stresses the necessity for the testing and retesting of cattle as an essential measure of control in preventing a re-establishment of this disease.

Lack of vigilance on the part of sanitary officials and a complacent attitude on the part of others who may consider the eradication of bovine tuberculosis an accomplished fact, must not be condoned at this time if disappointment and disastrous results are to be avoided.

PRESIDENT AXBY: The report has been approved by the Executive Committee. What is your pleasure?

DR. WESTMORLAND: I move the adoption of the report. The motion was regularly seconded.

PRESIDENT AXBY: All those in favor of the motion signify by saying aye, contrary no. The motion is carried and the report is adopted.
The next report is on "Parasitic Disease," by Dr. Benjamin Schwartz.

REPORT OF COMMITTEE ON PARASITIC DISEASES

DR. BENJAMIN SCHWARTZ, Chairman, Washington, D. C.

DR. J. E. ACKERT, DR. B. T. SIMMS,
Manhattan, Kansas Auburn, Alabama

DR. H. D. PORT, DR. E. A. WATSON,
Cheyenne, Wyoming Hull, Quebec, Canada

In conformity with the plan adopted during the past few years, the Committee on Parasitic Diseases desires to call attention to several outstanding research activities in the field of parasitology during the past year. The emphasis which is placed on the problems presented in this report is not intended to minimize the importance of other topics not herein included. This report focuses attention on a few important research problems that have a direct bearing on parasite control.

Skin Tests for the Detection of Trichina Infection in Swine

Following the demonstration by Bachman in 1928 that rabbits experimentally infected with trichinae gave a definite reaction when injected intracutaneously with an antigen containing trichina proteins in a suitable diluent, several investigators in this country tested the possibility of diagnosing trichinosis in human beings and in swine by a skin test involving an antigen identical with or similar to the one prepared by Bachman. One of the most extensive series of tests on human beings was carried out by McCoy, Miller and Friedlander in 1933. On the basis of the results obtained the investigators named concluded that "about 90 per cent of persons ill with trichinosis will give a positive skin test to the trichinella antigen provided the disease is sufficiently established." Recently (1938) Bozicevich described what he considered an improved method of preparing a trichina antigen and reported that 44 cases of trichinosis in persons were successfully diagnosed by the intracutaneous injection of the antigen so prepared.

Attempts by various investigators to diagnose trichinosis in swine by the intracutaneous test gave inconstant results. Schwartz, McIntosh and Mitchell in 1930 found the injection of the Bachman antigen to be unreliable for the detection of trichina infection in swine, when applied under conditions prevailing in a slaughter house. On the other hand, Augustine and Theiler in 1932 concluded from tests on 70 pigs that the intradermic injection of a trichina antigen
furnishes an accurate and reliable method of detecting trichina infections in swine.

Since the spring of 1937 work has been in progress in the laboratories of the United States Bureau of Animal Industry to develop an antigen that might prove suitable for the diagnosis of trichina infections in swine, the test to be applied to these animals immediately before slaughter. The results of this work, already published in 1939, are briefly as follows: 55 different antigens were tested on approximately 1,500 swine of various ages. Tests were made at the Agricultural Research Center, Beltsville, Md., on 95 swine experimentally infected with trichinae and on 294 of these host animals not infected and raised under conditions which precluded the possibility of extraneous infection. Tests were also made on about 1,100 swine coming to slaughter at various abattoirs operating under federal inspection. Of this group of swine, 54 were infected, as determined subsequently by the examination of the diaphragm of each pig tested, the infection having been acquired under natural conditions; the remaining swine were uninfected as determined later. The most outstanding feature of the total series of tests on approximately 150 trichina-infected swine was that 30 per cent of these host animals gave no reactions, and that only 49 per cent gave positive reactions; the remaining reactions were rather doubtful. Of the tests on over 1,300 uninfected swine, 77 per cent were negative, 8.5 per cent were positive, and the remaining host animals gave doubtful reactions. It is evident, therefore, from this data that the intracutaneous test for the detection of trichinosis in swine, as applied experimentally, was lacking in specificity and could not be relied upon to detect all infected animals. If an intracutaneous test is to be used on a practical basis, it should detect all or nearly all infected animals, irrespective of age, color, and the degree of infection. Moreover, the reactions must be of such intensity, distinctness and clarity that they will not be masked or confused with wrinkles or pigmented areas in the skin, or be masked by or confused with bruises, abrasions, or with any other of the abnormal conditions frequently found on the skin of swine coming to slaughter in abattoirs.

Quite recently Lichterman and Kleeman (1939) in a paper published in the American Journal of Public Health, reported that by using the antigen recommended by Bozicevich, they obtained positive reactions to the intracutaneous test in 97 per cent of trichina-infested hogs. A similar antigen was prepared and tested in the laboratories of the United States Bureau of Animal Industry with definitely disappointing results. When applied to 20 trichina-infected hogs, this antigen elicited positive reactions in only 7 animals; in 9 positive animals no reactions were elicited and in the remaining 4 pigs only weak or doubtful reactions were noted. In tests involving the use of this antigen on 257 uninfected hogs, 144 (56 per cent) gave no
reactions, but 106 (41 per cent) gave strong, positive reactions, the remaining ones giving only slight or indefinite reactions.

In the light of the evidence obtained in the investigations conducted in the United States Bureau of Animal Industry, it is evident that recommendations for the use of the intracutaneous test for the detection of trichina infection in swine under conditions prevailing in slaughter houses cannot as yet be regarded as meeting rigid meat inspection requirements.

The possibility of developing an intracutaneous test for the detection of trichinae in swine has certainly not been exhausted, despite the data presented in this paper. It is evident from all available facts that host animals infected with trichinae develop immunological responses of various sorts, and that the skin hypersensitiveness of infected host animals offers a possibility of developing a practical diagnostic test. Work designed to prepare an antigen that combines a high degree of specificity with stability, to render the product effective for practical use, is now under way in the zoological laboratories of the United States Bureau of Animal Industry.

Phenothiazine As An Anthelmintic

One of the most notable advances in anthelmintic medication was made by parasitologists of the United States Bureau of Animal Industry when they tested and established the efficacy of phenothiazine for the removal of internal parasites from sheep and swine. First synthesized in the latter half of the 19th century, phenothiazine, made by combining diphenylamine with sulphur, remained a chemical curiosity until the recent investigations conducted by the United States Bureau of Entomology and Plant Quarantine demonstrated that it was a promising insecticide. Successful tests with phenothiazine as an anthelmintic were first made by administering this drug to swine. The present indications are that this chemical, closely related to the thiazine dyes of which methylene blue is the most widely known, is about as effective for the removal of full-grown ascarids from swine in moderate or heavy infestations as is oil of chenopodium. Phenothiazine removes only a relatively small percentage of larval ascarids from the intestine; the efficacy of oil of chenopodium against larval ascarids is unknown. Phenothiazine has several advantages, however, over oil of chenopodium because it will remove on the average about 90 per cent of nodular worms from pigs; oil of chenopodium is wholly ineffective for the removal of nodular worms. Moreover, phenothiazine appears to be effective when administered with the feed. It has been demonstrated in the laboratories of the United States Bureau of Animal Industry that the therapeutic dose of phenothiazine is only a fraction of its toxic dose,
this high safety factor giving the drug a distinct advantage over oil of chenopodium.

The problem of controlling nematode parasites of sheep by anthelmintic treatment has been especially difficult for the reason that sheep usually harbor several species of pathogenic nematodes for which no single drug was available until the discovery of the anthelmintic efficacy of phenothiazine. Copper sulphate, perhaps the most widely used anthelmintic in sheep, is effective for the removal of the common stomach worm but has little or no effect on hookworms, nodular worms, and intestinal trichostrongyles. The addition of nicotine sulphate to copper sulphate produces a mixture which has some value for the removal of trichostrongyles, but the treatment in question is far from being satisfactory. Tests with phenothiazine showed that this drug is effective for the removal of most kinds of pathogenic nematodes that occur in the gastrointestinal tract of sheep, when administered in doses of 25 grams (approximately 1 ounce). In critical control tests on a limited series of sheep, phenothiazine removed a large proportion of the hookworms, nodular worms, both species of stomach worms, and intestinal trichostrongyles.

Although the anthelmintic value of phenothiazine was first announced by United States Bureau of Animal Industry investigators in December, 1938, confirmation of the value of this drug for the removal of parasites from sheep has been published already in Canada and Australia. There is evidence that considerable interest has been aroused over the introduction of this new chemical as a medicament and manufacturers have exhibited an interest in making phenothiazine available for use in treating animals. In this connection, it is important to bear in mind that phenothiazine prepared for insecticidal use is less satisfactory as an anthelmintic than phenothiazine not prepared for this purpose. Insecticidal phenothiazine contains a conditioner which increases the difficulty of administering the drug to animals internally, lowers the efficacy of the medicament and, incidentally, increases the cost. Much of the work reported in the Bureau of Animal Industry was performed with recrystallized phenothiazine in order to eliminate the conditioner. In a limited series of tests with crude phenothiazine, lacking the conditioner, it was determined that this substance is satisfactory as an anthelmintic and is, moreover, much cheaper than the recrystallized product.

An important contribution to the technique of preparing phenothiazine for administration to sheep was made by Dr. W. E. Swales of the Canadian Department of Agriculture. After numerous trials, this investigator prepared compressed tablets consisting of pulverized phenothiazine, 80 parts; pulverized starch, 9 parts; effervescent salts (sodium bicarbonate, 50 parts, and dehydrated tartaric acid, 45 parts), 9 parts; dried ox gall, 2 parts. This mixture was compressed
by means of a hydraulic press as used for expressing plant juices, the powdered material being reduced to a hard mass by a pressure of 4,000 pounds per square inch applied for one minute. The formula used has the theoretical advantage that water rapidly disintegrates the mass into very small particles, the latter being economically available for subsequent anthelmintic activity. The tablets are administered in adequate therapeutic doses, followed by a drench of water.

Barium Antimonyl Tartrate as a Treatment for the Poultry Gapeworm

As is well known, gapeworms clog the windpipe of young poultry and game birds, causing them to sneeze, cough, and gape for air. These parasites are especially harmful to chicks, turkey poults, goslings, and pheasants. A severe and an extensive irritation of the lining of the trachea is produced as a result of the presence of these worms. Affected birds become weak and emaciated and very frequently die, death being due primarily to the suffocation caused by the mechanical obstruction of the trachea by the worms. Similar symptoms may be caused by other disease agents, but if gapeworms are responsible, the worms may be found by destroying a sick bird and slitting open the windpipe. The bright red worms are usually found in the lower portion of the windpipe.

Investigations carried out by the United States Bureau of Animal Industry have demonstrated that powdered barium antimonyl tartrate, when inhaled by affected birds, is an effective drug for the treatment of gapeworm infestations in young chickens and turkey poults. For treatment, the birds are placed in a closed container or tight box and exposed to the chemical for 15 to 20 minutes. The size of the dose is determined by the cubic capacity of the container. One ounce of the finely-powdered dust is sufficient for a box having a capacity of 8 cubic feet. A box of this size will accommodate 50 chicks or 50 turkeys poults. The treatment box should be deep enough to permit the birds to stand erect and just enough birds should be placed inside the box to fill it about two-thirds full. The dust is introduced by means of a dust gun through a hole or an opening in one side of the box. At the start, one-third of the total dose is blown into the box, and the latter, if small enough, is then tilted slowly and repeatedly until the birds slide from one side to the other. The tilting of the box has a dual purpose. In the first place, the movement of the birds aid in redispersing any powder that may have settled on the feathers or on the floor of the box, thereby making it possible to use to the best advantage all the powder introduced. Secondly, any procedure that will cause the birds to stir suddenly will cause them to breath heavier and deeper, thus affording a better opportunity for the powder to reach the worms that may be located in the lower portion of the trachea. Five minutes after the intro-
duction of the first third of the powder, the second third is introduced, and the tilting repeated. The remaining powder is introduced 10 minutes after the beginning of the treatment and the box is again tilted. The birds are released 5 minutes after the last of the powder has been introduced. Treatment should not be continued beyond the 20-minute period because of the danger of the birds becoming overheated or suffocated.

As a result of tests involving 1,126 chicks and 236 turkey poults, the average efficacy of barium antimoyl tartrate for the removal of gapeworms was 92 per cent for chicks and 96 per cent for turkey poults. Post mortem, the experimental chicks averaged about 1 pair of worms for 5 birds while the controls average two pairs per bird; the experimental turkey poults averaged about 3 pairs of worms per two birds; the controls averaged nearly 21 pairs of worms per bird.

Experiments now in progress involving the treatment of mature turkeys for the removal of gapeworms indicate that this drug may be highly efficacious. In these experiments a small electric fan was placed in the box since the size of the box and the weight of the birds made tilting impossible. No experiments involving the use of this drug for the removal of gapeworms from pheasants have as yet been started due to the difficulty of obtaining these birds for experimental purposes.

Barium antimoyl tartrate is as yet not available commercially. However, it may be prepared in the laboratory by a chemist or druggist by following these simple directions. To prepare approximately 1 1/4 pounds of barium antimoyl tartrate, dissolve 244.3 grams of crystallized barium chloride in 800 cc. of warm distilled water having a temperature of 70° to 75°C., and pour this solution slowly into a warm solution of crystallized potassium antimoyl tartrate (667.8 grams) in distilled water (1,700 cc.), stirring vigorously with a glass rod. The precipitate that forms is filtered at once through paper with a suction filter, washed with cold water and then with alcohol to facilitate drying. The drying is carried out at room temperature, since the higher temperatures while the chemical is wet may cause decomposition. When properly prepared the product will pass through a 100-mesh sieve. Otherwise it must be ground to that degree of fineness.

In connection with the two new anthelmintics, namely, phenothiazine and barium antimoyl tartrate, emphasized in this report, the Committee feel that experimental tests with drugs represent the first step in the process of introducing new treatments for practical use. The next step involves the use of the drugs under a variety of conditions by professional workers competent to evaluate their merit by determining the value of the treatment for a specific purpose and noting untoward reactions, if any, on the part of the host. It is
suggested, therefore, that those who have an opportunity to use these new chemicals record in print their observations for the benefit of the livestock and poultry industries.

DR. SWARTZ: Mr. Chairman: This report is signed by me, carbon copies were sent to the other members of the committee, and I have in writing, their approval. I understand that the Executive Committee has already passed on the report and I move its adoption. The motion was regularly seconded.

PRESIDENT AXBY: It has been moved and seconded that the report be adopted. All those in favor of the motion signify by saying aye, contrary no. The motion is carried and the report is adopted.

As far as I know, that concludes the reports of the regular committees.

PRESIDENT AXBY: I will report to you as President of this Association, that in accordance with the Constitution and By-Laws, a Secretary-Treasurer was elected by the Executive Committee. That Secretary-Treasurer’s election was in exact conformity with the mandatory requirements of the Constitution, and the new Secretary-Treasurer is Mark Welsh. I do not want him to come forward at this time, but I did want to announce that fact.

Dr. Mark Welsh, you will have a chance to say whatever you want to say tomorrow, and I hope you say something tomorrow.

At the same time Dr. Welsh was named, I was authorized to appoint a nominating committee to report at this time a list of the officers for the ensuing year of 1940. We are ready to receive the report of the nominating committee, whose Chairman is Dr. Stubbs.

REPORT OF NOMINATING COMMITTEE

DR. C. D. STUBBS: The Committee on Nominations appointed by President Axby during the session of the United States Livestock Sanitary Association hereby nominates:

Dr. H. D. Port, Cheyenne, Wyoming, as President.

Dr. E. A. Crossman, Cambridge, Massachusetts, as First Vice-President.

Dr. I. S. McAdory, Auburn, Alabama, as Second Vice-President.

Dr. W. H. Hendricks, Salt Lake City, Utah, as Third Vice-President.

Respectfully submitted,

C. D. STUBBS,
H. C. GIVENS,
H. A. SEIDELL.
I wish to make a motion for the acceptance of this report. The motion was regularly seconded.

PRESIDENT AXBY: All those in favor of the motion signify by saying aye, contrary no. The motion is carried and the report is adopted.

INSTALLATION

Dr. Smith and Dr. Westmorland, get the officers together and bring them to the rostrum.

The new officers were escorted to the platform as the audience applauded.

PRESIDENT AXBY: I will start in with the President. Dr. Port, it is a pleasure to me to see you inducted into the office of the President of this Association. I recall very vividly the years of our friendly association. I know how sincerely you have tried to be a friend to the live stock industry, and I know how dependable you have been as a friend, not only to me, but to every other man so far as I know.

Therefore, I feel that I would not be doing my duty if I did not say to you and the people assembled, that they, in my opinion, have shown excellent judgment in making you their President.

Dr. Crossman, as First Vice-President, it shall be your duty to not only safeguard the interests of this Association, but, in the event the President is absent or detained, to occupy the position of President. I know of no man who could fulfill these requirements better than you.

As Second and Third Vice-Presidents, you are, in a manner, very insignificant, unless it be that the President or the First Vice-President be unable to occupy their positions. It is for situations such as this that these offices were provided for in the Constitution. We know that you are both worthy of such positions.

Now I am going to read the duties to this Secretary-Treasurer.

Mr. Secretary-Treasurer: The Secretary-Treasurer shall keep an accurate report of the proceedings of the Association, whenever authorized to do so by the Executive Committee; you shall publish such proceedings and distribute them to the members of the Association. The Secretary-Treasurer shall also keep an accurate record of the proceedings of the Executive Committee and shall furnish a copy to each member of said Executive Committee. He shall forward to each Executive Committee member a copy of each regulation approved by the Association. He shall keep an accurate account of all Association monies received and distributed. He shall also present
to the chairman of the Executive Committee a list, giving the name, occupation, and address of each application for individual membership for the approval of the Executive Committee. He shall perform such other duties as may be authorized and prescribed by the Executive Committee. He shall be ex-officio Secretary of the Executive Committee, also an ex-officio member, and Secretary of the Program Committee.

To you, Mr. Secretary-Treasurer, and to all of you, I now and hereby declare you installed as the officers of this Association for the year 1940. (Applause.)

PRESIDENT-ELECT PORT: Members of the United States Live Stock Sanitary Association: I feel highly honored in being selected for this important office. I assure you that I will put forth my best efforts in promoting the very important work of this Association, and in conducting the duties of this office.

The continued advancement of live stock sanitary measures necessitates the assistance, advice, and cooperation of every member of this Association, and I am looking forward to your help in this connection.

With the able assistance of the newly elected Secretary-Treasurer, and the other officers, I feel certain that the affairs of the Association can be carried on in a satisfactory manner. Again I want to express my appreciation for the confidence you have conveyed in selecting me as your President. I thank you. (Applause.)

FIRST VICE-PRESIDENT E. A. CROSSMAN: Mr. President, I thank you for your confidence, and the Association for the confidence they have in me. I realize that the duties of the Vice-President are not very arduous, but I give you my word that I will carry out any assignment given me to the best of my ability. Thank you. (Applause.)

SECRETARY-TREASURER WELSH: I think you all heard the duties given by the President, the duties of the Secretary-Treasurer, and you know if I carry out all of those duties that I'll have no time for speech making. (Applause.)

SECOND VICE-PRESIDENT I. S. McADORY: Mr. President and Members of the Association: I wish you all to remember that I will be ready to support you in any way that I can. Anytime you call on me, I am ready. Thank you. (Applause.)

THIRD VICE-PRESIDENT W. H. HENDRICKS: Members of the Association: I wish to thank you for this honor that has been conferred upon me. I have been coming to these Association meetings for a number of years. I have come here with the idea of gathering information, of carrying that information back to my
State to help in the carrying out of my duties and responsibilities to my stock men, and I have gained a lot of valuable information through the contacts with the very fine gentlemen that I have found as members of the Association.

Now if it can be my lot to assume any responsibility whatever in case it comes my way, I will be only too happy to give all the support that I can to the furtherance of this fine organization.

I wish to thank you again for the honor conferred upon me. (Applause.)

PRESIDENT-ELECT PORT: Is there any further business to come before the organization at this time? If not, the Chair will entertain a motion to adjourn.

DR. AXBY: I move we adjourn.

DR. SMITH: I second the motion.

PRESIDENT-ELECT PORT: All those in favor of the motion signify by saying aye, contrary no. The motion is carried and we stand adjourned.

The meeting adjourned at 3:05 p.m.
FINANCIAL STATEMENT

L. A. MERILLAT, Secretary-Treasurer *

RECEIPTS
May 31, to December 1, 1939

1939
June 6 State of Pennsylvania ........ $ 25.00
16 Int. Gov. Bonds ....... .... 53.79
30 Chas. E. Bell, Jr., dues ...... ........ 2.00
A. F. Sanders, dues, Walkerton, Ind. 2.00
July 7 State of Texas ....... ........ 24.63
21 Dr. T. B. Jones, Phoenix, Ariz. 25.00
23 A. J. Allott, dues ....... ........ 2.00
Nov. 21 Max S. Coates, dues ....... 2.00
G. H. Bruns, dues ....... ........ 2.00
Louisiana State Livestock Sanitary
Board ....... ........ 25.00
May 31 Received from Drovers National Bank
(Dr. L. Enos Day) ....... ........ 3,486.45
........ $3,682.26

DISBURSEMENTS

Miscellaneous Expense ....... ........ $ 165.35
Salary—L. A. Merillat ....... ........ 570.68
Salary — Miscellaneous ....... ........ 174.40
Petty Cash ........ ....... ........ 20.00
Printing ....... ........ 166.75
Furniture and Fixtures ....... ........ 116.50
........ $1,213.68
Balance (Cent. Nat'l Bank) November 30, 1939 2,468.58
........ $3,682.26

CURRENT ASSETS

Cash in Bank ........ ....... ........ $2,468.58
United States Government Bonds ....... ........ 5,200.00
Total ....... ........ $7,668.58

* Following the death of L. Enos Day in May of 1939, Dr. L. A. Merillat was appointed to fill the unexpired term as secretary-treasurer of the Association by President J. L. Axby. Complete records between the last annual report and Dr. Merillat's incumbency were not available, and the above report covers the financial transactions of the Association during Dr. Merillat's term of office.
44th Annual Meeting
United States Live Stock Sanitary Association
HOTEL MORRISON, CHICAGO, ILL.
DECEMBER 4—6
1940